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EXCHANGE RATE ADJUSTMENT AND THE PHILIPPINE ECONOMY

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Exchange Rate Adjustment and the Philippine Economy

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Exchange Rate Adjustment and the Philippine Economy

A Final Report

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Exchange Rate Adjustment and the Philippine Economy

Introduction

The exchange rate largely determines the allocation of goods and services across national borders. As such it is considered as one of the most important price variables in any market-oriented economy. The Philippines, which today is one of the most heavily indebted less developed countries, has come to realize that inappropriate exchange-rate policy contributes significantly to the persistence of balance-of-payments difficulties. Planners in government, particularly, are now in search of an exchange-rate policy that they hope will be part not only of a short-run stabilization program but also of a long-term plan for broad-based economic growth.

The questions that are asked in this regard are many. Should the exchange rate be fixed? What are the output and employment effects of a devaluation? Why does the Central Bank wait for its international reserves to fall to a critically low level before permitting a devaluation? Will a floating exchange rate improve resource allocation across industry sectors and income groups?

The few questions posed above attest to the important role played by the exchange rate and indicate the need for studies that may provide useful guides to policymakers. The study at hand is motivated by these.

A number of exchange-rate related issues are explored using an econometric model and applied general equilibrium analysis. The two models differ in terms of theoretical base and purpose. The purpose of the former may be thought of as normative while the latter is mainly predictive. In this sense, these two models may be viewed as complementing each other. These are briefly described below.

Chapter II presents the simulation results of a Macroeconometric model under an endogenous nominal exchange rate assumption. The detailed description of the model is described including the simulation assumptions. Four scenarios were examined and are presented in Table 3 of this Chapter. The scenarios assumed different settings for the variables reserve money, US Gross National Product (GNP) and net capital flows under an endogenous exchange rate. The following are the results of the summary of findings based on forecasts for 1991 and 1992.

The demand driven model indicates that for different scenarios, growth in 1991 and 1992 (between 2 to slightly

more than 3% if reserve money grow at 10%) if the international environment replicates that of 1990. In this slowdown, real investments will be the one to suffer most as its decline already started in 1990. The low growth result, therefore, affects adversely the future productive capacity of the country. Even if real investments increase, a higher growth in reserve money will mean lower growth rate and higher inflation. The exchange rate hovers around 27.5 pesos per dollar for 1991 and near 31 pesos per dollar for 1992. It is higher for higher monetary growth rates and lower net capital inflows, as expected. Note that by endogenizing the exchange rate, we see that, if past policies are to be followed, there will be very little changes in the exchange rate movements even if certain circumstances change. This means that the authorities react to different circumstances in a rather rigid fashion with respect to the exchange rate. Because the Philippines is facing severe supply bottlenecks since 1989 a supply-driven model is also constructed. The supply-led model gives a bleaker picture than its demand counterpart.

The sectoral and economy-wide effects of a devaluation are examined through a general equilibrium model presented in Chapter III. Twelve sectors are represented in the model. The model is calibrated to the benchmark year of 1989. This chapter shows the effects of correcting a trade deficit through a devaluation on factor prices and real trade flows. The price and output responses tariff restrictions are also analyzed. The impact of a devaluation on the fiscal deficit is also discussed. One of the main results of the simulation exercises is that the Philippine currency is overvalued by approximately 25 percent.

The discussion on the political economy aspects of a devaluation in Chapter IV makes use of the simulation results of the previous chapters. Chapter V presents the study's concluding section. The conditions for a successful devaluation are described. Previous experience of the Philippines on exchange rate adjustment indicates the importance of timing and the accompanying macroeconomic policies for the success of a devaluation.

The annex contains a description of exchange rate management practices and country experiences. It also presents overvaluation indicators/measures (e.g. EER indices) used in policy discussions. An update and revalidation most of the indicators using available yearly and monthly data were also done. The recommended are implemented in an electronic spreadsheet for monitoring purposes using available monthly data. The indicators are real and nominal effective exchange rate indices for different groupings of partner countries and competitor countries.

Chapter I

The Effects of Devaluation: A Review of Theory

Chapter I

The Effects of Devaluation: A Review of Theory

1. Introduction

There are several approaches used to analyze the effects of devaluation and the mechanism through which it corrects payments imbalance. In this paper, we look at the following approaches, namely: (1) the elasticities approach; (2) the absorption approach; (3) the Keynesian approach; (4) the monetary approach; (5) a synthesis approach; (6) the new classical approach; and, (7) the structuralist approach. These approaches, although quite different, are complementary.

2. Devaluation: A Review of Theory

2.1. The Elasticities Approach

The elasticities approach is a Marshallian partial-equilibrium approach which focuses on how a change in the relative price or terms of trade brought about by a devaluation causes substitution between goods, both in consumption and in production. Under this approach, the effects of devaluation are as follows: (1) there will be an equiproportional real devaluation since domestic prices are assumed to be fixed and completely independent of the exchange rate; (2) exports will be stimulated, imports will

decline, and the trade balance will improve as long as the Marshall-Lerner condition (that the sum of the price elasticities of demand for domestic exports and imports exceeds unity) holds; and, (3) output and employment may increase or decrease (the approach is not explicit since it is a partial equilibrium approach).

2.2. The Absorption Approach

In contrast to the elasticities approach, the absorption approach focuses on the economy as a whole and emphasizes income effect. It uses the identity income less absorption equals the trade balance, imlying that any improvement in the trade balance requires excess of income over absorption. Its basic postulate is that when resources are fully employed, a devaluation cannot improve the current account balance unless domestic absorption is reduced to accommodate the expenditure-switching effect of the devaluation. The effects are as follows: (1) relative prices and the real exchange rate are affected if devaluation works through expenditure-switching; (2) trade balance will improve if devaluation reduces expenditure relative to income, because of expenditure reducing or expenditure switching; and, (3) output may increase if there are unutilized resources and, in general, a devaluation that has a positive effect on relative prices and generates expenditure switching will have positive effect on output.

2.3. Keynesian Approach

2.3.1. A Simple Keynesian Model

The elasticities approach is based on a partial equilibrium analysis of the trade sector alone while the absorption approach is more concerned with the macroeconomic response to devaluation. Nevertheless, since devaluation has price and income effects, the two approaches can be integrated. This simple Keynesian model with fixed domestic price level, wages, and interest rate integrates the two approaches. In this model, at the initial level of output, a devaluation lowers the relative price of domestic goods or the terms of trade. Given that the Marshall-Lerner condition is satisfied, it exerts an expenditure-switching effect in favor of domestic goods and the trade balance improves. The resulting increase in production and income induces imports to rise, which dampens the initial improvement in trade balance and income.

Thus, the effects of devaluation are: (1) relative prices are always affected because domestic prices are given and not affected by devaluation; (2) trade balance will improve as long as the Marshall-Lerner condition holds; and, (3) with demand-determined output, a devaluation will be expansionary; it will increase net exports, aggregate output, and employment.

2.3.2. The Mundell-Fleming Model

The Mundell-Fleming model is an open economy extension of the IS-LM model. This model assumes that the domestic price level and wages are fixed but the nominal interest rate can change. Devaluation lowers the terms of trade or the price of domestic relative to foreign goods, increases net exports and therefore aggregate demand. Its impact effect would be to move to a new short-run equilibrium where income and interest rate are higher and there is a surplus. Over time, increases in the money supply resulting from surpluses drive the economy to long-run equilibrium. In this equilibrium, income is even higher but interest rate is lower, the (flow) BOP surplus initially created by the devaluation is eliminated, and the cumulative increase in reserves is equal to increase in the long-run equilibrium size of the nominal money supply.

2.3.3. Keynesian Aggregate Supply - Aggregate Demand Model

This model takes into account the fact that prices and wages are no longer fixed. In effect, a devaluation makes the economy relatively more competitive through a decline in real wage and price of domestic relative to foreign goods. Starting with a situation of trade balance and full employment, the impact effect of a devaluation is to switch demand toward domestic goods; aggregate demand, income, and price level all increase and the trade balance improves.

Over time, surpluses will cause the money supply and, thus, aggregate demand to increase. At the same time, since the economy has moved above full employment, nominal wage will rise as labor contracts are revised and domestic real wages increase to their predevaluation level and hence short-run aggregate supply will decrease. These adjustments in both aggregate demand and aggregate supply will continue until the economy reaches a long-run equilibrium where output has returned to its initial level, trade surplus disappears, and the price level is even higher so that purchasing power parity holds in the sense that the exchange rate and the price level change by the same proportion. However, reserves have increased by an amount equal to the increase in the money supply.

2.4. Monetary Approach

2.4.1. Devaluation Under a Monetary Approach to the BOP

The aim of this section is to stress the contribution of fiscal and monetary factors to a devaluation, the collapse of a fixed exchange rate. Fiscal factors refer to policy actions of the government that affect the size of the public debt, while monetary factors include all government decisions affecting the composition of the public debt. If current expenditures of the government exceed current revenues, then a budget deficit is incurred.

If the deficit is monetized, then the general price level goes up. At the higher inflation rate, the relative price of imports goes down, thereby raising the quantity demanded of imports. This induces local residents to go to the foreign exchange authority, the Central Bank (CB), to exchange their pesos for dollars or some other hard currency. Under a fixed exchange rate, the CB commits its reserves of gold and foreign exchange to maintain the peg, an intervention that leads to a decline in the international reserves of the CB.

If the budget deficit persists and it is continually being monetized, then the CB may find its vaults emptied eventually of international reserves. The depletion of the CB's foreign reserves is usually hastened by speculators who bet that the CB cannot maintain the peg. This is one important reason for having large foreign reserves relative to the money supply. After the real cash balance of residents reaches a critically low level, then they will try to replenish it, causing the money demand function to shift. This raises the interest rate and dampens aggregate demand. Since a balance of payments deficit may be viewed as an excess of aggregate spending over aggregate income receipts, the shift in money demand tends to correct the external imbalance. However, if the level of official foreign reserves is low relative to the money supply, constant monetization of the government budget deficit results in a

depletion of foreign reserves prior to the automatic rise in the interest rate. Once official foreign reserves are depleted, the fixed exchange rate is abandoned. In other words, the peso is devalued.

In formal terms, the effect of a devaluation, if properly done, is to restore balance in the demand for real money balance and its supply. Suppose we start from a disequilibrium position, that is, the supply of real cash balance exceeds demand:

(1) $M/P > L(Y,R)$

where M is nominal money stock, P is the price level, Y is real income, R is a nominal interest rate and $\delta L/\delta Y > 0$ and $\delta L/\delta R < 0$.

Let the relationship between domestic price, P, and foreign price, P^* be given by:

(2) $P = EP^*$

where E is the nominal exchange rate, i.e., the number of pesos per, say, dollar.

Assuming P^* is fixed, we see from (2) that a devaluation implies an increase in P. Consequently, M/P

goes down which tends to bring a balance between money demand and supply. Assume that after the devaluation the CB ushers in a flexible exchange rate regime. Then there exists an E' which balances money demand and supply:

(3) $M/P' = L(R,Y)$.

where $P' = E'P^*$.

In this simple model, we note that a devaluation leads to a one-shot increase in the price level, without any adverse effect on output or interest rate.

In case the monetary authority fixes the exchange rate after the devaluation and also decides to reduce the nominal money stock, then one may move to a disequilibrium position where the real money balance falls below the demand for it. That is:

(4) $M'/P' < L(R,Y)$.

In this situation, equilibrium may be restored by reducing money demand. This is achieved by reducing real income, Y, and by raising the interest rate, R. Thus we observe a period of high interest rate and declining output.

A devaluation is also prescribed to a country with a balance-of-payment problem for its expenditure-switching effects. A devaluation induces a shift of spending from imports to exports (In the presence of intermediate goods, however, some cross elasticity effects are to be expected, but for convenience, we ignore this here). An improvement in the trade and current accounts of the balance of payments may thus be expected from a devaluation.

2.4.2. Monetary Model with Traded Goods Only

A more recent approach to devaluation is the monetary approach (see Frenkel and Johnson 1976). This approach assumes full employment, price flexibility, and one composite good. Unlike the Keynesian approach, this approach abstracts from substitution effect that may arise from a change in the terms of trade and focuses instead on the supply of and demand for money. In this approach, real balance effects constitute the main channel through which a devaluation affects the real sector of the economy.

In a simple monetary model, Dornbusch (1973a) has shown that a devaluation would improve the current account balance even if it had no influence whatsoever on the real exchange rate (i.e., no expenditure switching effect). Specifically, a devaluation in a small economy will increase the price of traded goods by the full percentage of the devaluation.

Since the price of traded goods enters into the price level, the price level also increases, causing real money balances to decrease. Domestic residents will reduce spending below income so as to accumulate money balances with which to replenish their reduced real money balances. As a result, there will be an excess flow demand for cash balances that is matched by an excess flow supply of real goods, implying that the immediate effect of devaluation is to create trade surplus given the initial money supply. However, the increase in money supply implicit in surplus reduces the incentive for hoarding (flow demand for money or excess supply of goods in nominal terms) and causes the system in the long-run to return to full equilibrium with all real variables remaining unchanged. Thus, devaluation improves trade balance only temporarily; once individuals have acquired desired money balances, trade surplus vanishes. The long-run effects are to increase reserves (due to temporary surplus) and to increase the domestic price level and the money supply by the same proportion, leaving real money balances unchanged.

In sum, the effects are: (1) relative prices or the real exchange rate will not be affected because under PPP a nominal devaluation has a one-to-one effect on domestic prices; however, the terms of trade will remain the same because devaluation increases the prices of exports and imports by the same proportion; (2) a devaluation will

generate a real balance effect that will result in a temporary trade surplus; and, (3) output is not affected in the short-run or long-run since it is exogenous at full employment.

2.4.3. A Monetary Model with Traded and Nontraded Goods

This model emphasizes the effects of changes in absorption on relative prices rather than the income effect of changes in the relative price of traded good. In this model, it is assumed that there are two goods traded and nontraded, and the relative price is not the terms of trade between exports and imports but between traded and nontraded goods.

Dornbusch (1973b) has shown that the conclusion of the one commodity model continue to hold for the effects of a devaluation on the trade balance and the price of traded goods; the additional effect that arises is that the reduction in absorption causes the relative price of nontraded goods to fall. Specifically, a devaluation, by increasing the domestic currency price of traded goods, increases the price level, thereby reducing real money balances at a given level of the nominal money supply. Individuals will reduce spending in order to restore the real value of money balances, causing the relative price of nontraded goods to fall which in turn has two effects, both

of which improve trade balance: (1) it switches domestic consumption toward the now relatively cheaper nontraded goods and away from traded goods like imports and (2) it shifts production toward the now relatively more profitable traded goods like exports and import competing products. Short-run equilibrium obtains where there is trade surplus, nominal income is higher but spending remains the same. This influence of devaluation on trade balance is only temporary. Over time, the decline in real money balances could be eliminated through hoarding and adjustments will continue until real money balances are back to their levels, inducing the relative price of nontraded good to also go back its level. Reserves increase and the price of nontraded increases until long-run equilibrium is reached where the price of nontraded goods and the money supply are both higher.

Thus, in addition to the trade balance effect, there is the additional efffect on relative price of nontraded goods. This means that the existence of nontraded goods reinforces the effect of the terms of trade on the trade balance.

2.5. A Synthesis Approach

The simple Keynesian model and the monetary approach provide two extremes with regard to the role of devaluations in the adjustment process. A more relevant approach is a

synthesis approach which combines characteristics of of both. In a version of this approach, the following are assumed: imported intermediate inputs, sticky wages and prices in the short-run, imperfect substitution between domestic and foreign assets, no PPP relation in the s dom run, upward sloping aggregate supply curve, and an equilibrium real exchange rate that responds to a series of real fundamental determinants. Here, the effects of devaluation depend to a large extent on the initial state of the economy and on the accompanying macroeconomic policies; specifically, (1) relative prices will be affected in the short-run; real exchange rate may also be affected in medium to long-run if initial condition is one of real exchange rate misalignment (effects depend on macropolicies); (2) trade balance will improve if devaluation affects real exchange rate; in particular, if prices are slow to adjust and the real exchange rate is misaligned, a devaluation that is supplemented by appropriate policies will result in a real devaluation; (3) aggregate output may either increase or decrease because the increase in the relative price of the intermediate input will tend to reduce output and employment.

2.6. New Classical Model: Rational Expectations

The devaluation literature discussed so far has two restrictive assumptions: perfect certainty and static

expectations. Turnovsky (1981) analyzes the effects of exchange rate change in a stochastic model in which domestic agents form expectations rationally. He shows that in the long-run the exchange rate and the price level change by the same proportion and output remains the same; however, in the short-run, the qualitative effects of a devaluation depends upon the accuracy of expectations.

Preannounced Devaluation. This is the case where devaluation is correctly anticipated before it actually occurs. Once devaluation is announced, people will expect demand for domestic goods to rise and thus inflation to increase. Since in the long-run, devaluation would lead to an equiproportional rate of inflation of domestic prices, people will expect domestic prices to rise by the same proportion as the devaluation. Domestic real interest rate remains the same because expected devaluation induces an increase in domestic interest rate to compensate investors in domestic assets from losses due to announced devaluation; thus investment remains unchanged. Since the domestic price level and exchange rate have not yet changed, the relative price of foreign to domestic goods remains the same, with no effect on the trade balance and hence on aggregate demand during transition. With devaluation not yet in effect, domestic prices remains the same and will be expected to remain so during predevaluation. With actual and expected prices being the same, aggregate supply also remains the

same. Thus, the equilibrium is the same as before. The most visible immediate effect of preannounced devaluation is to lead to some capital flows, losses of reserves, increase in domestic interest rate, and bargaining over wage adjustment. After devaluation is undertaken, the domestic price would increase in proportion; aggregate demand increases; aggregate supply also increases, since the bargained wage increases obtained by workers during transition would be in effect; hence, output, real interest rate and real wages are unaffected.

Unrealized Devaluation. Devaluation is anticipated but the government decides not to devalue; thus, devaluation is expected but unfulfilled. During transition or the period preceding the point in time at which a devaluation is expected to occur, the economy behaves like it would under a preannounced devaluation: workers expect prices to increase proportionally to the devaluation and hence will bargain for cost of living increase to be in effect the moment the devaluation is expected to occur; nominal interest rate increases; and, reserves decrease. At that moment when the government is expected to devalue but no action is actually undertaken, the following will happen: real wage will increase (since labor contracts are already drawn with corresponding cost of living clauses embodied in them), causing labor costs to increase and aggregate supply to decrease; there will be inflationary pressures even if

actual devaluation has not occured; specifically, if people retain their expectation that devaluation will occur, they will continue to believe that there will be inflation, but given that prices are already increasing, they will expect the devaluation to cause a less than proportionate increase in prices when it occurs, i.e., the expected rate of devaluation will exceed the expected rate of inflation, causing an increase in the real interest rate and a decrease in investment and aggregate demand. Thus, an expected but unfulfilled devaluation is stagflationary.

Unanticipated Devaluation. In the short-run, a completely unanticipated devaluation increases aggregate demand and hence output and employment. However, it generates inflation although, initially, the rise in domestic prices is less than proportional to the devaluation. Note that the source of the short-run output increase is the unanticipated price increase resulting from the unanticipated devaluation. Since the price increase is unexpected, it is not embodied in labor contracts and results in reductions of real wage and thus increased production. In the long-run, contracts are revised, with the expected price increase embodied in them. Inflationary expectations arise, which decreases aggregate supply and induces a long-run equilibrium where prices are even higher but output is back to the full employment level.

2.7. Structuralist Approach

According to the traditional view, devaluation will have an expansionary effect on aggregate output if there is unutilized capacity or, in the worst case, it will leave output unchanged if the economy is operating under full employment. This view has been challenged by the structuralist approach (for instance, see Krugman and Taylor (1978) and van Wijnbergen (1986)). Contrary to the traditional view, there are several reasons why a devaluation can be contractionary. As enumerated by Edwards (1989), these are: (1) a devaluation will generate a negative real balance effect which will lower aggregate demand and, possibly, output; (2) a devaluation, instead of stimulating aggregate demand, can actually be contractionary if the resulting relative price change favors groups in the economy with low marginal propensities to consume (Krugman and Taylor (1978)); (3) a devaluation may worsen the trade balance and, hence, reduce output if the pice leasticities of imports and exports are sufficiently low; and, (4) in addition to these demand-related effects, there are also supply-side channels through which devaluation can be contractionary; e.g., in van Wijnbergen's (1986) model, a devaluation increases the domestic currency price of intermediate inputs and causes an upward shift in the aggregate supply schedule.

3. Remarks

This paper has reviewed the literature on the theory of devaluation. Several approaches to the analysis of devaluation have been presented. These approaches, although quite different, are complementary and represent different views of the same phenomenon. Thus, in analyzing the effects of devaluation, one must use a combination of the several approaches. However, one must also take into account the issues pertaining to the distributional, pessimistic consequences, and effectiveness of devaluation.

Chapter II

A Macroeconometric Model

Chapter II

A Macroeconometric Model

One limitation of macroeconometic models (as pointed out also by rational expectationists) is that responses of endogenous variables to exogenous ones are based on past, historical circumstances which were a result possibly of wrong policies or different environments and so should not be extended to the future as predictions of what will actually happen, or worse, of what should happen. This is particularly true in our attempt to endogenize the exchange rate in the macro model. For the behavior of policy makers since the seventies has actually been one of trying to keep the peso from depreciating (through Central Bank interventions in the peso market) unless there is a severe balance of payment crisis and there is no other choice but to devalue the currency. Thus substantial devaluations occurred during times of crisis and it is therefore not surprising that the macrodata show lagged export responses to devaluations of the peso. Balance of payment crisis periods are usually characterized also by supply shocks that adversely affect export performance. This further gives credence to the lagged response of exports to exchange rate changes (and we got this by having to assume that the intercept is zero -- see Equation 4 of Table 1.)

One must therefore interpret the following macroeconometric results in the following light. To use the regression results, the assumption must be that the Authorities will continue protecting the currency and will only devalue the currency substantially only when there is a serious balance of payment crisis. Given also the short-run nature of the model (we try to forecast results for 1991 and 1992), what we get would be the stagflationary impact (a la Krugman and Taylor) of exchange rate devaluations. It must be pointed out that the macro model cannot capture most of the efficiency aspects of a currency devaluation using regression analysis (we of course try to capture the effect of a devaluation on export performance) partly because of the short-run and macro (one-sector) nature of this analysis and partly because past policies since the seventies have prevented any possibility of past data showing positive general macro responses to any currency devaluations, except through the lagged response of exports.

The Model

Our macro models are made up of a demand-determined model and a supply-determined one. The demand-determined model determines GNP using the usual national accounting identity of consumption expenditures plus government expenditures plus investments plus exports less imports plus net factor income from abroad (plus some statistical

discrepancies). The model is more suitable for a situation wherein critical supply bottlenecks are not present and output demand can be easily accomodated by the economy. The supply-determined model assumes an output supply function limits the supply of goods and services of the economy.

The supply function is given in the first equation of Table 1. Real output of the economy (GNPR) is negatively related to the real wage (the wage index divided by the GNP price index), the real domestic cost of imports (the peso price index of imports divided by the GNP price index) and positively related to total liquidity divided by the GNP price index (total liquidity is measured by M3), capital stock, and the gross international reserves of the country. The first two variables are the real prices of inputs to production (labor and imported inputs). Real liquidity measures the credit avaialbility for working capital needs. Using either the financial liberalization school or the new structuralist school, this variable is important in determining supply since equities markets are weak and firms are highly dependent on loans for funding their working capital requirements. International reserves was also included in the variables since interventions in the foreign exchange market and the overvaluation of the peso effectively ration vital foreign exchange needed for funding imported inputs. We must also point out that the exchange rate affects output through the domestic price index of

imports since movements in the exchange rate affect the peso cost of imports.

The second equation in Table 1 gives us the exchange rate equation which is positively related to the exchange rate of the previous period and last year's GNP price index, and negatively related to the level of international reserves. This equation is assumed to be very much affected by policies of the monetary authorities in their decision whether to protect the currency or not.

Equation 3 says that the wage index is positively affected by last year's GNP price index (the assumption being that wage increases lag behind price increases) and the level of capacity utilization (here measured by real GNP divided by the estimated capital stock).

Equation 4 is a key equation since it shows that real exports are strongly and positively related to the GNP of the US in nominal dollar terms and the real exchange rate (measured by the nominal exchange rate divided by the GNP price index) lagged one period. Note that in this equation, we make the assumption that the intercept is zero (i.e. if real exchange rate and USGNP are zero then real exports are zero). The dummy variable indicating the years of debt moratorium and economic collapse (1984 and 1985) show some negative correlation to export performance.

Equation 5 shows real imports strongly and positively correlated to real GNP and to the price level (GNP price index). It is also significantly and negatively correlated to the domestic (peso) price index of imports.

Equations 6 and 7 are convenient equations predicting merchandise exports and imports (in dollars) from real exports and imports of goods and services (in constant peso terms). Equation 8 predicts service exports and other inflows in the current account (except net transfers in the current account).

Equation 9 predicts the price level which is positively related to domestic price of imports, the wage index, total liquidity and negatively correlated to real GNP.

Equation 10 says that gross international reserves is positively correlated to its past value and to the balance of payment. Equation 11 shows total liquidity as determined mainly by reserve money.

In Equation 12, tax revenues are positively related to nominal GNP, negatively related to a dummy indicating the structural adjustment period 1979 to 1983, and positively to a dummy indicating the tax amnesty period (1979 to 1985).

Equation 13 shows real investment being positively related to total real liquidity (M3 divided by the GNP price index) and last year's GNP (a sort of "animal spirit" indicator). It is highly and negatively correlated to domestic (peso) price index of imports. Equation 14 shows real private consumption being primarily determined by disposable income (real GNP minus real value of tax revenues). Equation 15 determines nominal government consumption (in the national income accounts) from total government expenditures (derived from the fiscal accounts).

Equations 16 to 29 are identities used in the models. Equation 16 is the usual expenditure components of GNP which are real private consumption, real investments, real government consumption, real exports, net factor income from abroad, statistical discrepancy, less real imports. This equation replaces equation 1 in the demand-led model.

Equation 17 gives us the balance of payment equation which is merchandise exports less merchandise imports, other current inflows less other current outflows in the current account, net transfers from abroad and net capital inflows.

Equations 18 and 19 give us the level of total government expenditures given the tax and non-tax revenues as well as a national budget deficit fixed at 2.5% of nominal GNP.

Equation 20 gives us the capacity utilization equation which is real GNP divided by capital stock. Equation 21 gives us the disposable income equation, which is real GNP less taxes in real terms. Equation 22 gives us the capital stock equation assuming a 5% depreciation rate.

Equation 23 gives us the equation for the domestic (peso) price index of imports. For the simulations, it is assumed that world prices remain in their 1990 levels, so that changes in the domestic price of imports reflect mainly changes in the exchange rate.

Equations 24 and 25 simply give the equations for the growth rates of GNP and GNP price index (the inflation rate), respectively. Equations 26 to 28 express the exchange rate, government consumption expenditure and total liquidity (M3) in real terms. Equation 29 derives nominal GNP from real GNP.

Table 2 gives the list of endogenous and exogenous variables and their descriptions.

The Simulation Runs

Table 3 gives us the simulation results. We assume that reserve money will increase by 10% annually (roughly the target of the government and the IMF) or by a less

conservative 20%. We also assume either a pessimistic scenario wherein USGNP and net capital inflows from abroad are at the 1990 level and a more optimistic one wherein USGNP grows at 5% annually and net capital inflows are 10% higher for 1991 and 1992 than in 1990. The combination of these give us four scenarios as shown in Table 3. Unless otherwise stated, all other exogenous variables are assumed to remain in their 1990 levels.

First let us look at the result of the demand-determined model. The first section of Table 3 shows the critical variables. On top are the actual values of the critical variables for 1989 and 1990 so that we can compare these with our predictions for 1991 and 1992. We summarize our findings below:

1. There will be slow growth in 1991 and 1992 (between 2 to slightly more than 3% if reserve money grow at 10%) if the international environment replicates that of 1990. Due mainly to this and to the peso depreciation in late 1990 (the import levy tax of 9% is not modeled here), imports are increasing less than in previous years. This will mean a higher BOP position and a higher level of gross international reserves. Inflation rates will also be lower than in previous years.

2. In this slowdown, real investments will be the one to suffer most as its decline already started in 1990. The low growth result, therefore, affects adversely the future productive capacity of the country. It must be pointed out that the decline in real investments, using our investment equation, is due to a large part to the decline in real liquidity due to a conservative monetary policy.

3. For the demand-led model, a higher growth in reserve money will mean lower growth rate and higher inflation, even if real investments increase. This is basically because in our model a higher monetary growth will give a kick to imports, bigger than the increase in investments. This is in strike contrast to the results in the supply-led model. Because of higher import levels and higher inflation, the peso devaluation is slightly higher in the higher monetary growth rate scenarios.

4. It must be pointed out that the exchange rate is just slightly different from one scenario to the other. The exchange rate hovers around 27.5 for 1991 and near 31 for 1992. It is higher for higher monetary growth rates and lower net capital inflows, as expected. Note by endogenizing the exchange rate, we see that, if past policies are to be followed, there will be very little changes in the exchange rate movements even if certain circumstances change. This means that the Authorities react to different circumstances in a rather rigid fashion with respect to the exchange rate. Due to the slow growth in the next two years, import demand is low and balance of payments are expected to be in surplus and international reserves are adequate. Thus the exchange rate movements are mainly due to an adjustment to price movements in the previous years when inflation rates in the Philippines were higher than the world rates. It must also be pointed out that exchange rate increases or peso devaluations are less in general when international reserves are higher. A higher inflation rate also accompanies a higher exchange rate.

5. Export growth is rather low in 1991 and 1992 if the international environment is not conducive (scenarios 1 and 2). If US nominal GNP grows by 5% annually within these two years then export growth will be much faster. The result shows that the not insignificant devaluation in 1990 will not be adequate to affect a substantial increase in exports especially if the world market is at an ebb.

6. As expected, a more conducive international environment (a higher growth rate in USGNP and a higher net capital inflow) will lead to a higher growth rate and higher balance of payments and international reserves positions. In the best scenario (scenario 3), a more conducive international environment may bring the Philippines out of the doldrums as early as 1992. A more conducive external environment also means that the peso depreciation will be slightly less than in a more pessimistic scenario.

The above runs assume that growth is demand-led. In a way the predictions are more optimistic since most economists believe that the Philippines is facing severe supply bottlenecks since 1989. The supply-led model indeed gives a bleaker picture than its demand counterpart. The results are summarized as:

1. There will be a negative growth rate (-1.5%) in 1991 if there is tight monetary growth and if world conditions are stagnant. The bleak picture continues through 1992 with almost zero growth rate. The bleak condition is caused primarily by tight monetary policy which restricts required credit (real liquidity actually declines if reserve money is restricted to grow 10%) in the economy. The decline is secondarily caused by the not insignificant devaluations that would occur in the two periods. Also important is the stagnancy of capital stock as real investments decline. Again we should emphasize the decline in real investments because of the austere policies that are being implemented.

2. The decline is just about staved off if reserve money is allowed to grow 20%. Even with this we enter into a low growth scenario in the next two years.

3. Balance of payment and international reserves are higher now due to the much lower growth rates and lower import demand.

4. In the low growth (almost recessionary) scenario, real wages are expected to fall in the next two years.

5. With a more conducive international environment, GNP growth rate may be allowed to reach almost 3% in 1992, but 1991 remains in the doldrums with almost zero growth.

Conclusion

The results of the two sets of simulation point to the low or negative growth rates looming for the Philippine economy in the next two years. The way to avoid this is to fight for a higher net capital outflow from abroad and hope for a more conducive environment for our exports. If we believe the supply-led model is operative in our economy, then less austere measures and a more lax policy in the monetary and fiscal sectors are called for.

We see that the exchange rate hardly changes with the various scenarios which shows some resilience by policy makers to stick to old policies of keeping the exchange rate at a particular level irregardless of circumstances.

The model also shows the short-run stagflation effects of devaluations, which makes it a hard political decision. Furthermore, export responses to devaluations are lagged and are not strong enough to counter adverse international conditions. All these point to the fact that, if we believe in the medium and long-run beneficial effects of currency

adjustments on efficiency and export performance, one has to try to overcome its short-run negative effects, especially if these occur during hard times. One must also urge the Authorities to allow for adjustment in the peso during normal, or even good, times in order to reap the export benefits in a more conducive atmosphere. Otherwise, devaluing fast and hard only during times of extreme balance of payment crises will be a self-fulfilling prophecy that devaluation will only mean crisis.

Table 1

Equations Used in the Macro Models

Regression Equations

1. GNPR

```
= 44189.236 - 120.165*WR - 97.684*PIMR +
  (2.37**)    (-1.19)      (-1.85*)

  1.367*TLR + 0.109*K + 2.184*IRESCB
  (10.91**)   (3.43**)  (3.14**)

  R-squared = 0.99                DW = 2.08
```

2. EXR

```
= 3.503  +  0.461*EXR(-1) - 0.001*IRESCB +
  (3.47**)  (2.25**)        (-3.23**)

  0.015*PGNP(-1)
  (3.18**)

  R-squared = 0.98                DW = 1.91
```

3. W

```
= -100.904 + 354.847*CAPU + 0.508*PGNP(-1)
  (-1.02)    (1.52)         (12.89**)

+ [AR(1) = 0.623, AR(2) = -0.748]
   (2.65**)       (-2.72**)

  R-squared = 0.98                DW = 2.18
```

4. XR

```
= 743.019*EXRR(-1) + 5.042*USGNP -
  (4.40**)           (27.44**)

  1729.792*DUM1 + [AR(1) = 0.290]
  (-1.68)          (1.10)

  R-squared = 0.97                DW = 2.06
```

5. MR

```
= -7460.895 - 56.193*PIM + 53.008*PGNP
  (-4.46**)   (-11.98**)   (13.51**)

  + 0.335*GNPR
    (12.52**)

  R-squared = 0.98                DW = 1.87
```

6. XD

```
= -407.762 + 0.281*XR + [AR(1) = 0.644]
```

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(-0.43) (6.23**) (3.58**)

R-squared = 0.94 DW = 1.53

7. MD = 474.095 + 0.312*MR + [AR(1) = 0.789]
(0.44) (8.26**) (6.51**)

R-squared = 0.97 DW = 1.45

8. OXD = -333.983 + 0.284*(MD(-1)+XD(-1))
(-1.20) (10.44**)

R-squared = 0.86 DW = 0.68

9. PGNP = 15.040 + 0.526*PIM + 0.858*W + 0.0009*TL
(0.27) (11.46**) (2.84**) (1.80*)

- 0.001*GNPR
(-1.89*)

R-squared = 0.99 DW = 1.28

10. IRESCB = 357.322 + 0.828*IRESCB(-1) + 0.280*BOP
(1.43) (5.73**) (2.25**)

R-squared = 0.66 DW = 2.05

11. TL = 50378.093 + 2.289*RM + [AR(1) = 0.897]
(1.10) (9.14**) (6.75**)

R-squared = 0.99 DW = 1.81

12. TX = -3235.155 + 0.126*GNPN - 11824.69*DUMTA
(-0.99) (25.33**) (-2.69**)

+ 10749.708*DUMSAL
(2.20**)

R-squared = 0.98 DW = 1.58

13. IR = -4638.992 + 0.411*TLR - 25.224*PIM
(-0.52) (1.82*) (-3.42**)

+ 0.308*GNPR(-1) + [AR(1) = 0.618]
(1.90*) (2.00*)

R-squared = 0.94 DW = 1.76

14. CPR = 13408.948 + 0.243*GNTXR
(0.40) (2.61**)

+ [AR(1) = 1.524, AR(2) = -0.485]
(4.028**) (-1.99)

R-squared = 0.99 DW = 1.87

15. G = 40948.839 + 0.350*GEXP + [AR(1) = 0.927]
(0.44) (2.52**) (3.91**)

R-squared = 0.98 DW = 1.92

Identities

16. GNPR = CPR + IR + CGR + XR - MR + NFIAR + STATDR a/
17. BOP = XD - MD + OXD - OMD + NTRANS + KA
18. GEXP = TX + NTX + DEFG
19. DEFG = 0.025*GNPN
20. CAPU = GNPR/K
21. GNTXR = GNPR - (TX/PGNP*100)
22. K = 0.95*K(-1) + IR(-1)
23. PIM = EXR*PIM(-1)/EXR(-1)
24. GRGNPR = (GNPR - GNPR(-1))/GNPR(-1)*100
25. INF = (PGNP - PGNP(-1)/PGNP(-1)*100
26. EXRR = EXR/PGNP*100
27. CGR = G/PGNP*100
28. TLR = TL/PGNP*100
29. GNPN = GNPR*PGNP/100

---

* significant at 10% level
** significant at 5% level
a/ replaces GNPR regression equation in the demand-led model.

Table 2

List of Variables

Endogenous Variables

BOP	- Balance of Payments, in million US dollars
CAPU	- Capital Utilization
CGR	- Real Government Consumption, in million pesos
CPR	- Real Private Consumption, in million pesos
DEFG	- National Government Deficit, in million pesos
EXR	- Nominal Exchange Rate (Pesos/US dollar)
EXRR	- Real Exchange Rate
G	- Nominal Government Consumption, in million pesos
GEXP	- Government Expenditures, in million pesos
GNPN	- Nominal Gross National Product, in million pesos
GNPR	- Real Gross National Product, in million pesos
GNTXR	- National Disposable Income, in million pesos
GRGNPR	- GNPR Growth Rate
INF	- Inflation Rate (GNP deflator)
IR	- Real Private Investment, in million pesos
IRESCB	- Gross International Reserves of Central Bank, in million US dollars
K	- Capital Stock, in million pesos
MD	- Merchandise Imports, in million US dollars
MR	- Real Imports of Goods and Services, in million pesos
OXD	- Other Inflows in the Current Account, in million US dollars
PGNP	- GNP Deflator (1972 = 100)
PIM	- Index of Peso Price of Imports
RM	- Reserve Money, in million pesos
TL	- Nominal Total Liquidity, in million pesos
TLR	- Real Total Liquidity, in million pesos
TX	- Tax Revenue, in million pesos
W	- Nominal Wage Rate of Unskilled Workers, (1972 = 100)
WR	- Real Wage Rate of Unskilled Workers
XD	- Merchandise Exports, in million US dollars
XR	- Real Exports of Goods and Services, in million pesos

Exogenous Variables

DUM1 - Crisis Period, Dummy: 1 - 1984-85
0 - otherwise

DUMSAL - Structural Adjustment Loan Period, Dummy: 1 - 1979-83
0 - otherwise

DUMTA	- Tax Amnesty Period, Dummy: 1 - 1979-85 0 - otherwise
KA	- Net Capital Inflows from Abroad in the Current Account, in million US dollars
NFIAR	- Net Factor Income from Abroad, in million pesos
NTRANS	- Net Transfers in the Current Account, in million US dollars
NTX	- Non-Tax Revenue, in million pesos
OMD	- Other Outflows in the Current Account, in million US dollars
STATDR	- Statistical Discrepancy in the National Accounts, in million pesos
TIME	- Time Period
USGNP	- U.S. Nominal Gross National Product, in million dollars

Table 3a*
Results of the Simulated Runs Using Demand-Led Model

	1989	1990
CPR	78929	83789
IR	18283	18201
CGR	9997	10367
GRGNPR	5.7	3.08
XD	7821	8186
MD	10419	12206
BOP	451	-185
IRESCB	2324.17	1993.11
EXR	21.74	24.31
INF	10.59	14.21

	Scenario 1		Scenario 2	
	1991	1992	1991	1992
CPR	88702.2	93379.12	88586.48	92907.85
IR	16167.57	14425.12	16724.35	14849.07
CGR	9682.03	9637.52	9580.05	9331.62
GRGNPR	2.64	3.08	2.15	1.62
XD	8287.03	8266.82	8287.03	8258.63
MD	12258.55	12152.68	12532.48	12720.59
BOP	485.72	615.05	211.79	116.83
IRESCB	2144.03	2305.22	2067.35	2102.25
EXR	27.5	30.71	27.59	31.35
INF	12.56	7.89	14.83	11.84

	Scenario 3		Scenario 4	
	1991	1992	1991	1992
CPR	88995.42	94087.73	88879.81	93616.61
IR	16337.73	15408.94	16895.67	15837.55
CGR	9765.22	9846.35	9662.88	9537.06
GRGNPR	3.89	4.75	3.4	3.31
XD	8688.5	9088.41	8688.5	9080.23
MD	12445.14	12619.74	12719.16	13187.77
BOP	950.3	1386.49	676.29	888.19
IRESCB	2274.08	2628.88	2197.38	2425.88
EXR	27.35	30.2	27.44	30.84
INF	12.25	7.18	14.52	11.15

*See end of Table 3b (page 21) for description of scenarios

Table 3b
Results of the Simulated Runs Using Supply-Led Model

	1989	1990
GRGNPR	5.7	3.08
WR	50.43	52.59
PIMR	82.89	82.86
TLR	28207.18	29232.09
K	308272	316955
IRESCB	2324.17	1993.11
BOP	451	-185
EXR	21.74	24.31
XD	7821	8186
MD	10419	12206

	Scenario 1		Scenario 2	
	1991	1992	1991	1992
GRGNPR	-1.55	0.92	0.27	2.15
WR	49.01	46.49	48.2	45.03
PIMR	82.96	85.55	81.76	83.02
TLR	28143.61	28364.05	29677.21	31084.31
K	319308.3	319648.6	319308.3	320129.4
IRESCB	2261.27	2539.08	2119.92	2164.76
BOP	904.53	1103.63	399.59	184.59
EXR	27.36	30.34	27.53	31.23
XD	8287.03	8264.88	8287.03	8257.77
MD	11839.74	11543.08	12344.67	12598.58

	Scenario 3		Scenario 4	
	1991	1992	1991	1992
GRGNPR	-1.13	1.68	0.69	2.9
WR	49.2	46.94	48.38	45.45
PIMR	82.65	84.75	81.46	82.24
TLR	28229.38	28663.9	29765.77	31393.87
K	319308.3	319846.4	319308.3	320328.3
IRESCB	2414.71	2925.06	2273.28	2550.35
BOP	1452.73	2028.5	947.43	1108.27
EXR	27.18	29.74	27.35	30.63
XD	8688.5	9086.08	8688.5	9078.99
MD	11942.71	11832.53	12448.01	12889.35

Scenario 1: 10% increase in RM annually, USGNP is the same as in 1990, KA is the same as in 1990

Scenario 2: 20% increase in RM annually, USGNP is the same as in 1990, KA is the same as in 1990

Scenario 3: 10% increase in RM annually, 5% increase in USGNP annually, 10% increase in KA for 1991 and 1992 from 1990 level

Scenario 4: 20% increase in RM annually, 5% increase in USGNP annually, 10% increase in KA for 1991 and 1992 from 1990 level

Chapter III

General Equilibrium Effects of a Currency Devaluation

Chapter III

GENERAL EQUILIBRIUM EFFECTS OF A CURRENCY DEVALUATION

3.1 INTRODUCTION

This paper aims to measure the economy-wide effects of devaluing the Philippine currency. A computable general equilibrium model of the Philippine economy is developed and used for computing the economic impacts of the currency devaluation. The main features of the model which distinguish this from conventional CGE models include a monetary sector highlighting the transactions demand and a fixed supply of money and a foreign exchange rationing mechanism in the event the government chooses to fix the nominal exchange rate. The model is for a small open economy and distinguishes goods by place of origin. The model is dynamic featuring an aggregate consumer with infinite life who maximizes his intertemporal utility function. Whatever amount the consumer saves is invested by him to acquire the existing capital stock net of depreciation and purchase the newly produced capital goods.

The features built into this model are incorporated in order to enable the model calculate the following economic impacts: prices, resource allocation, production, trade flows, investment, consumption, fiscal and trade deficits, and economic welfare of policy measures. In addition to the above economic impacts, the model aims to contrast the alternative strategies of devaluing the currency and of contractionary monetary policy. The former tends to encourage expenditure switching while the latter reduces

aggregate spending to solve the imbalance in the country's external payments. It is interesting to find out what these strategies have in store for the overall economic growth in the economy.

The model is calibrated to the benchmark year of 1989. The input output data that is used in this study is based on the 1985 input output survey (yet to be published by the NSO). The 1985 input output table was updated to 1989 using value added ratios for 1985 and 1989. Since 1985 was a recession year, the data on final demands and trade flows were separately estimated since the reported final demands would reflect the recessionary situation of the economy. However no independent estimate was made for the inter-industry and value added transactions since these are more linked to production technology rather than to the level of aggregate spending prevailing in the year the survey was made.

The model has twelve production sectors, namely crops; livestock; fishery; resource industries; agricultural processing; textile, apparel and leather; wood and paper products; chemical products; other industries; construction and utilities; production-related services; and other services.

Motivation of the Study

It is increasingly felt in many policy circles now that the current structural imbalance in the country's balance of payments is no longer sustainable without any adjustment in the country's exchange rate. The commodity trade deficit alone is estimated to amount to about three billion dollars in 1990. The prospect of

offsetting services exports is growing dim because of the Gulf crisis and the continuing political disturbances in the country which scares away foreign tourists and investors. The country has had negative net resource transfers with its foreign commercial creditors. While official flows continue to come into the country, such flows are inadequate to finance the growing current account deficit. Moreover the prospect of increasing this amount is clouded by the political liberalization in Eastern Europe which also needs official development assistance from bilateral and multilateral sources.

Thus one of the possible solutions which remains is for the government to devalue the Philippine peso. At the present, the government's exchange rate policy is officially floated within a range determined by the monetary board. Despite the galloping trade deficit, the rate has relatively been stable at a range of from 22 to 25 pesos to a US dollar since 1986 when the Aquino government was installed by election and people power. This was due to a combination of expenditure reducing macro-economic policies and capital flows. Riding high on an international sympathy for it and the country ravaged by years of economic mismanagement by the previous government, the newly installed democratic government of President Aquino was able to attract new capital flows which financed partly the trade deficit. When such flows were inadequate, the country's monetary managers clamped down on the growth of the money supply and borrowed substantially in the local financial capital markets. This increased domestic interest

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rates which in turned dampened spending, mostly private investments, and eased partly the pressure on the government to devalue the currency.

Several reasons are offered by proponents of a currency devaluation why the expenditure-reducing stabilization policies such as the monetary contractionary monetary policy are inadequate. The Philippine economy has a substantial amount of unused labor resources. It is not about to hit a full employment equilibrium. Thus fears of inflation would seem unfounded unless of course aggregate spending would mostly fall on current consumption and not on investments. Reducing the aggregate level of demand at this stage will only worsen the present unemployment problem. Secondly, such policies will dampen the rate of economic growth in the country. The economic growth rate is a barometer of the health of the economy. Sluggish growth rates will not induce foreign investors to invest in the country, aggravating the balance of payments difficulties. Thirdly, to the extent that the past policies had crowded out private investments in favor of financing the fiscal deficit, capital resources are transferred to the government which is generally seen to have a lower marginal efficiency of investment than the private sector.

In contrast, a currency devaluation will generally maintain the current level of spending but changes the composition of such spending from on foreign to locally manufactured goods and services. With a devaluation, local goods and services will become more competitive abroad, increasing both local production and

exports. Imports will become more expensive and the amount demanded by the country will be reduced in favor of locally manufactured import substitutes. This shift towards expenditures on locally produced goods and services will help close the country's current account deficit without the wasteful temporary retirement of the country's labor resources under the past policies.

But questions about the other effects of a currency devaluation remain? These are:

1. How much is the domestic currency overvalued?
2. How will the country's resources be reallocated among the various sectors of the economy following a devaluation?
3. What is the effect of this policy on the fiscal deficit

Organization of the Paper

This paper attempts to answer some of these questions using an applied general equilibrium model of the Philippine economy which is developed in this study. In doing this, we divide the paper into three major parts. The next section describes the analytical structure of a general equilibrium model of a small open economy with a monetary sector. The third section discusses the numerical specification of the general equilibrium model using Philippine economic data. This discussion is followed by the third part of the paper wherein the simulation results using the applied general equilibrium model of the Philippine economy are presented. The paper's major findings are listed in the concluding section of the

paper.

2. ANALYTICAL STRUCTURE OF THE MODEL

Basic Model

Consider a small open economy with N local production sectors, N Armington or composite good sectors, K variable factors, an aggregate consumer, and the government. The local production sectors produce both an import substitute and an exportable good. Import substitutes and exportable commodities are assumed to be qualitatively different. A transformation function between the import substitute and the exportable defines how the various producers in a given sector allocate resources for export and local use.

A composite-good sector aggregates the import and its corresponding local substitute into a composite good which in turn is demanded by producers as intermediate inputs and by consumers and investors for final consumption. An Armington elasticity of substitution between the local and imported goods defines how users of the commodity shift from one to the other as prices change.

Production Sectors

Each sector consists of competitive producers with identical technology. The production technology is a nested Leontief-function of an aggregate intermediate input and value added. The aggregate intermediate input is a Leontief function of the N composite goods. The value added is a Constant Elasticity of Substitution (CES)

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function of variable and a sector-specific factor.

The transformation function is described by the following:

$$T_j = T_j(Q_j^s, E_j^s, -V_j, -A_j) = 0. \tag{1}$$

where Q_j^s and E_j^s are the respective amounts of the import substitute and the exportable that are produced in sector j. The function T_j is a constant elasticity of transformation (CET). The elasticities of transformation in the model define the curvature of the production possibility surfaces.

The value added function in sector j, V_j, is a function of two variable factors, capital (K_j) and labor (L_j), as well as a sector-specific factor, F_j:[1]

$$V_j = \left[\alpha_j K_j^{\rho_j} + \beta_j L_j^{\rho_j} + (1-\alpha_j-\beta_j) F_j^{\rho_j}\right]^{\frac{1}{\rho_j}} \tag{2}$$

If we let σ_j be the elasticity of factor substitution, then this is equal to $1/(1-\rho_j)$. The variable capital in each sector is the depreciation cost. Labor is assumed to be homogeneous and perfectly mobile between sectors. The sector-specific factor is a composite of fixed factors including fixed structures, machineries, and land. These factors cannot be profitably moved to other

[1] The notation convention is used that supplies or outputs are superscripted with the letter and demands do not have any superscripts at all. For example, K^s refers to the supply of capital (K) in the economy while K_j denotes the demand for capital in sector j.

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sectors within the time period required for the economy to reach an equilibrium following a shock.

The intermediate inputs are used in fixed proportion to the amount of output that is produced. If we choose the unit of output of the composite goods, the import substitute and the exportable such that their respective producer prices are one, then we can define the input-output coefficients a_{ij} as follows:

$$(Q_j^s + E_j^s)\ a_{ij} = R_{ij} \tag{3}$$

where R_{ij} is the amount of intermediate input i required to produce the joint output of the import substitute and the exportable in sector j. Formally,

$$A_j = \min[\frac{R_{ij}}{a_{ij}},\ i=1,2,\ldots,N] \tag{4}$$

The profit function in each sector is defined as:

$$\pi_j = p_{Sj}\ Q_j^S + p_{Ej}\ E_j^S - r\ K_j - w\ L_j - \sum_{i=1}^{N} p_{Cj}\ R_{ij} \tag{5}$$

where p_{Sj} and p_{Ej} are the producer prices of the import substitute and the exportable; p_{Ci}, w and r are the prices paid by producers for the composite good i, labor and variable capital respectively. The profit in sector j is the imputed earnings of the fixed factor in the sector. The first derivatives of the profit function with

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respect to p_{Sj}, p_{Ej}, w, r and p_{Ci} give the output supply functions of the import substitute and the exportable produced; the factor demands for labor and variable capital; as well as the intermediate demand for the composite good of producers in sector j respectively.

Adding up the demand for an input of all sectors in the economy gives the total demand for the inputs in the economy. Formally,

$$L^D = \sum_{j=1}^{N} \frac{\partial \pi_j}{\partial w}$$

$$K^D = \sum_{j=1}^{N} \frac{\partial \pi_j}{\partial r} \qquad (6)$$

$$C_i^{ID} = \sum_{j=1}^{N} R_{ij} \qquad i=1,2,\ldots,N$$

where L^D, K^D and C_i^{ID} are respectively the total demands for labor, variable capital and a composite good i used as intermediate inputs.

Composite Good

Users of outputs in the economy have a choice of using an imported good or its corresponding locally produced substitute. Let C_{js} to be the amount available of the composite good associated with an import which competes directly with the import substitute produced in sector j. Then:

$$C_j^s = \left[\gamma_j Q_j^{\mu_j} + (1-\gamma_j) I_j^{\mu_j}\right]^{\frac{1}{\mu_j}} \tag{7}$$

Q_j and I_j are respectively the use of the import substitute j and the imported good j in producing the composite good C_j^s. The parameters μ_j's reflect the scope of substitution between the imported and the locally produced good while the parameters γ_j's are the respective shares of the locally produced in the total cost of the composite good. The input combination of the import and its substitute depends upon the following cost minimization condition:

$$\frac{\partial C_j^s/\partial Q_j}{\partial C_j^s/\partial I_j} = \frac{q_{Ij}}{q_{Qj}} \tag{8}$$

where q_{Ij} and q_{Qj} are respectively the user prices of the import and its substitute. From equation 8, one can derive the demands for the imported good or service and its local substitute.

The supply of imported good j to this small-open economy, I_j^s, is perfectly price elastic. Let $\bar{v}_{Ij}$ be the world price of the imported good j denominated in foreign currency and FX_j be the foreign exchange which is required in order to buy an imported good j. The amount of foreign exchange required per unit of the imported good j is computed as:

Since in a small open economy world prices are given, this per unit requirement of foreign exchange to import is fixed.

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$$\frac{FX_j}{I_j^s} = \bar{v}_{Ij} \tag{9}$$

Private Consumer

Private consumers are represented in the model by an aggregate private consumer who is endowed with the resources used in local production. These endowments constitute the respective total supplies of labor, variable capital and sector-specific factors.

$$\begin{aligned} L^s &= \bar{L} \\ K^s &= \bar{K} \\ F_j^s &= \bar{F}_j \end{aligned} \tag{10}$$

The income of the consumer (Y_p) is given by the following:

$$Y_p = w\bar{L} + r\bar{K} + \sum_{i=1}^{N} \pi_i + NLST_p \tag{11}$$

where $NLST_p$ stands for the net lump sum transfers received by the private consumer. This amount covers the direct, payroll and other taxes and fees collected by the government net of subsidies received from the latter. Only indirect tax measures including customs duties, excises and value added taxes are explicitly incorporated in this model. It is thus assumed that these excluded income flows are transferred between the government and private consumer without adding additional distortions in the economy.

The consumer maximizes a Cobb-Douglas utility function subject

to his income constraint:

$$\text{Max } U = \prod_{i=1}^{N} C_{Pi}^{\delta_i}$$
$$\text{s.t. } \sum_{i=1}^{N} q_{Ci} C_{Pi} - Y_P = 0 \qquad (12)$$

where C_{Pi} and q_{Ci} are respectively the amount that is demanded by the private consumer and the price paid by consumers for the composite good and δ_i is the proportion of income spent on the composite good i.

Government Sector

The government is featured here as another consumer in the model. Its income (Y_G) is derived from capital inflows (FK) denominated in foreign currency, net lump sum transfers received ($NLST_G$), and the revenues from customs duties (T_M) and excises (T_E):

$$Y_G = T_m + T_E + VAT + NLST_G + eFK \qquad (13)$$

where e stands for the exchange rate. The tax revenue components of the government's income are computed as follows:

$$VAT = \sum_{i=1}^{N} t_{Vi} p_V V_i \qquad (14)$$

$$T_E = \sum_{i=1}^{N} \tau_{Ei} p_{Ci} C_i^s \tag{15}$$

where τ_I and τ_E are respectively the N-dimensional vectors of effective tax rates on imported products and domestic sales of the composite good and value added. If a sector is not subject to a given tax, then the sector's tax rate in the corresponding tax vector is equal to zero.

As the private consumer, the government is assumed to have a Cobb-Douglas utility function which it maximizes subject to its income constraint.

Foreign Trade and External Payments

Since the country is a price taker in export markets the demands of the rest of the world for the country's exportable goods are perfectly price elastic. The amount of foreign exchange that is generated from selling the amount of exportable good produced in sector j is computed as:

$$FX_j^S = \overline{v_{Ej}}\, E_j^s \tag{16}$$

where $\bar{v}_{Ej}$ is the exogenous world price of exportable j. If the world price of good j falls, then the per unit requirement of exported good j to earn one unit of foreign exchange will be lower. Changes in these world prices are in a way equivalent in the

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modeling sense to changes in production technologies.

The trade deficit in the model is equal to:

$$TD = \sum_{j=1}^{N} \left[\overline{v_{Ij}} \, I_j^s - v_{Ej} E_j^s \right] \tag{17}$$

An exogenous amount of capital inflows FK enters the country every period. As discussed above under the specification of the government's income, this amount is given to the government. However in real life, these inflows are made up of foreign private investments, private and public sector short and long-term borrowing from abroad, official development assistance and income transfers received by residents in the country from the rest of the world. The amount is net interest payments on foreign debt, any profits repatriated abroad by multinational corporations, debt amortization, any lending to the rest of the world by residents and other outgoing income transfers.

The balance of payments account is equal to:

$$BP = TD - FK \tag{18}$$

Exchange Rate Policy

One additional policy distortion that is introduced to the basic model above is a having an upward-rigid nominal exchange rate. The nominal exchange rate is defined to be the current price of foreign exchange in terms of the local currency. If the value of the local currency in terms of real output goes down, then the

nominal exchange rate increases or the exchange rate depreciates all other things remaining the same. However if the government fixes this rate at a certain level and the money supply is not adjusted to be consistent with the fixed level of the nominal exchange rate, then the real side of the economy including at least the volume of imports has to change to obtain virtual equilibrium in the economy. This is done through a virtual tax on the use of foreign exchange which is endogenously determined so as to eliminate the excess demand for imports or the excess supply of money in the economy. Under this policy of fixing the nominal exchange rate, money can no longer remain neutral and therefore it is important that an explicit monetary sector be likewise introduced into the model.

The exchange rate policy is represented by the following:

$$e = \min(\epsilon, \bar{e}) \tag{19}$$

where ϵ and $\bar{e}$ are respectively the market clearing exchange rate and the level at which the government fixes the the nominal exchange rate.

A simple transactions demand for money is specified in this model. Denoting this demand to be M^D,

$$M^D = \sum_{i=1}^{N} p_{Ci}(C_{Pi} + C_{Gi}) \tag{20}$$

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where units of money is defined so as to set the velocity of money equal to one. The supply of money in the model is fixed by the government at $\bar{M}$:

$$M^S = \bar{M}. \tag{21}$$

Since the nominal exchange rate is rigid upwards, foreign exchange may have to be rationed out to importers. This process is done by calculating a virtual tax on the use of foreign exchange. Called the premium rate on foreign exchange, this tax makes foreign exchange more expensive to users which in turn cuts down on the demand for foreign exchange. Rents are thus generated equal to the product of this premium rate and the value of imports at world prices in local currency or:

$$FXR = \lambda e \sum_{j=1}^{N} \bar{v}_{Ij} I_j \tag{22}$$

where λ is the foreign exchange premium. This income goes to the government who is assumed in the model to auction foreign exchange to importers and gets revenues in return. Thus the income equation of the government (equation 13) is thus modified to incorporate these foreign exchange rents.

If e is less than or equal to $\bar{e}$, then λ is equal to zero. That is, the policy that is featured here is one where the nominal exchange rate is rigid upwards.

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General Equilibrium Conditions

The general equilibrium conditions in this basic model consists of the following:

(a) zero profit conditions in all production activities in the economy;

(b) market clearing conditions for all goods and services produced; and

(c) balance of payments condition.

These conditions total 9N+7 equations distributed as follows. There are 4N+2 zero profit conditions; 5N+4 market clearing conditions and the balance of payments condition.

In equilibrium the exchange rate may assume the market-clearing value ϵ provided this is at most $\bar{e}$. If ϵ is greater than $\bar{e}$, then the equilibrium value of λ has to be greater than zero so as to ration the available foreign exchange.

This system of equations is to be solved for the following endogenous variables: 4N+2 production activity levels, 5N+4 prices and the exchange rate or λ if the market clearing exchange rate is above the fixed nominal exchange rate, $\bar{e}$. But for the purposes of measuring the extent of the overvaluation of the currency, the exchange rate is allowed in the model to exceed $\bar{e}$.

3.3. CALIBRATING THE MODEL

In this section we discuss the procedure in calibrating the CGE model specified in the preceding section. The benchmark period

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of the model is 1989. This choice is influenced by such factors as the availability of the data set, the likelihood that the economy was close to equilibrium, and practical policy relevance of the model's results using the model.

1985 is the latest year in which a complete input-output survey of the economy was undertaken. The results of this survey are not published yet. Input-output (IO) tables are central data blocks in calibrating general equilibrium models. The last published IO table was for the year 1983. A copy of the preliminary 1985 table was obtained from the National Statistical Coordinating Board (NSCB) in the form of computer diskettes. The final copy to be published by NSCB will not be much different from this preliminary table, according to the agency.

The 1985 IO table consists of 428 sectors, thus far the largest of the country's IO tables. 1985 however was not ideal for undertaking an IO survey. The economy was still coming out of a fairly deep recession and the transactions recorded in that survey certainly reflected this state of the economy. But given the level off disaggregation in the 1985 IO table, the study would likely be throwing away a substantial amount of useful and latest information on the structure of the intermediate input transactions which go on in the Philippine economy if the entire 1985 IO table would not have been used.

The intermediate input-output coefficients of the 1985 IO table were thus utilized in this study. The intermediate input-output transactions in 1985 were updated to 1989 using ratios of

value added for each sector in 1989 to that of 1985. The procedure entailed scaling each of the values under a column in the intermediate transactions with the corresponding value added ration for the column. Since the vector of value added by sector was obtained for some 42 sectors of the Philippine economy, the 428-sector 1985 IO table was first aggregated to a 42-sector one before the intermediate transactions were scaled using the value added ratios. Separate steps were done in obtaining data for the final demands and components of the value added. These will be discussed shortly.

1989 was probably not an equilibrium year for the Philippine economy. But this study asserts that of the three most recent years starting with 1990, 1989 comes closest to being an equilibrium year. 1990 was a year in which the country had to go through several destablizing factors. The Philippines started out that year recuperating from the adverse effects of the coup attempt undertaking by military rebels in December 1989. Strong typhoons and above all the big earthquake in 1990 followed the list of problems the economy had to endure in that year. 1990 ended with bleak forecasts for the economy adjusting to higher energy prices and a worsening balance of payments problem fueled by a large trade deficit and diminishing capital flows in that year.

1988 was not more stable than 1989. In 1988, various businesses in the country were adjusting to the import liberalization program which the government undertook since 1986.

The model consists of twelve production sectors. Table 1

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below lists down these sectors and their correspondence with the 126 input-output table of 1983.[2] The sectors include crops; livestock and poultry; fishery; resource industries; agricultural processing; textiles, apparel and leather; wood, paper, and rubber; chemical products; petroleum products; machineries and transportation equipment; other industries; and services.

The components of the respective value added generated in the various sectors of this model were obtained using the 1983 input output table. Proportions of wages and salaries, depreciation, and operating surplus to the total of all three components of value added in the 1983 data were calculated. Estimates of indirect taxes collected from each of the sectors for 1989 were independently obtained and subtracted from the respective value added. The remainder were then decomposed into labor costs, depreciation, and other value added using the proportions computed from the 1983 input output data.

The results of all these computations are shown in Table 2. The components for labor, capital depreciation and other value added are net of any direct taxes. Labor is assumed to be a variable factor in the model. Adjustment costs for labor are regarded to be small in this analysis. Capital has a variable and a fixed component. Variable capital consists of costs of replacing worn out fixed capital assets. Fixed capital consists of structures, machineries, land and similar factors which are assumed

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[2] This excludes the notional industry. The correspondence between the 428-sector 1985 IO table is available from the author of this chapter.

to be too costly to move to other sectors at least for the period covered by the analysis.

Only two major indirect taxes are incorporated in the model namely the tariffs and excise taxes. The value-added tax, direct taxes, and other tax income, including fees, are treated as lump sum transfers by private consumers to the government.

Table 3 shows the inter-industry transactions for the 12 sectors in the model. The basic data used to calculate these transactions is the 1985 428-sector IO table. A correspondence was obtained between this and the 12-sector IO table used in the model. The transactions as reported in the 1985 data were updated to 1989 by multiplying each column of the 1985 input output data with the value added ratio for 1989 and 1985. The result of these computations are shown in Table 3.

Table 4 presents the components of final demand in the model. Private consumption consists of personal consumption expenditures, gross fixed capital formation and net inventory change. The 1985 final demand estimates by input-output sector were not used because in 1985 the economy was in deep recession. What was done then was to get the aggregate figure for private and government consumption, gross capital formation and net inventory change from the 1989 national income accounts data. These aggregate figures were then decomposed into input output sectors using the structure obtaining in 1983 for which the next most recent input output data was available.

However for the trade data, the exports and imports were

independently estimated from the foreign trade statistics of the country in 1989. Adjustments were made in order to make these estimates consistent with the published current and capital accounts data for 1989, a summary of which is reproduced in Table 5. The average exchange rate then for the period was 21.74 pesos to a US dollar.

Table 6 shows the various sources of income of the government in 1989. The total income which is reported in the government's ''Progress Report On the Philippine Agenda for Sustained Growth and Development'' amounts to 152.4 billion pesos. Estimates of the government's income obtained from published data by the Department of Budget and Management, National Statistics Office and the annual reports of tax collections of the Bureau of Internal Revenue added up to 1.9 billion pesos less than the Progress Report's 152.4 billion pesos. The discrepancy in the two figures was added to Table 6 under the item collections from other government offices.

Tables 7 and 8 give the expenditure and income profiles and the indirect tax rates of the Philippine economy for 1989. The expenditure and income data were obtained from the national income statistics and the balance of payments statistics published by the NEDA. The tax rates reported in Table 8 were adjusted to take into account the inefficient administration of these taxes. The adjustment factors range from 65% in the case of tariffs, 56 % in the case of excise taxes, and 18.31 % in the case of the value added taxes. The VAT is a fairly recent tax measure in the Philippines and the registration of VAT payers has yet to be

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improved. These factors are ratios of actual to potential revenues, with the latter defined by multiplying the base of the tax with the average book rates.

The above data from Tables 2 to 8 were assembled to construct a general equilibrium data set. This data set conforms to the structure of the model as defined in the preceding section. Minor adjustments were done on the input-output data and this was done using the RAS procedure. The procedure converged after 30 iterations.

A list of the entire computer program is shown in the appendix. This program is run using the MPS/GE algorithm developed by Rutherford (1988).

Elasticities

The substitution elasticities which underlie the calibration process are all assumed to be equal to one. It is beyond the scope of this study to undertake an econometric estimation of the model's elasticities. It is not uncommon in applied general equilibrium analysis that some of these parameters are assumed and sensitivity analysis conducted in order to find out how the results of the CGE analysis will change as the assumed values of the parameters are altered.

3.4. EMPIRICAL RESULTS

Description of Model Simulations

In this section we undertake several currency devaluation

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simulations using the CGE model developed for this study. The results to be discussed shortly depend upon the model's structure and parameters as well as the characterization of the events which make a devaluation necessary.

Two policy questions are asked in the following policy experiments. One is about the extent of the currency overvaluation induced by foreign capital inflows which substitute for export earnings in settling for the country's growing trade deficit. The other question is how much is the currency overvalued because of the country's tariff protection policies.

In answering the first question, the foreign capital flows were taken out of the model. This puts the foreign exchange market out of equilibrium and then we let the exchange rate adjust to restore equilibrium in the country's external payments. This is done while holding real spending constant in the economy. This requires that the consumers in the economy are compensated in a way which holds their overall welfare constant at the same level as in 1989.

To answer the other policy question, tariff policies were hypothetically lifted while allowing 1989 capital flows to come into the country. Tariff liberalization encourages imports which then tend to increase the trade deficit. The exchange rate is then allowed to adjust in order to eliminate the trade deficit. As in the case of the first exercise, the welfare of the government and the private consumer are held constant in the analysis.

Extent of Currency Overvaluation Due To Capital Flows

The central result in this exercise is that the exchange rate has to be devalued by about 20 percent in order to eliminate the trade deficit. The capital inflows accommodate the country's trade deficit. Export earnings can lag behind the country's growing import bill because of the foreign capital inflows. Most of these come in the form of new long term loans and official development assistance.

The exchange rate measured in terms of pesos per one US dollar increased by 19.87 percent or 20 percent. If the equilibrium exchange rate is now 28 pesos to a US dollar, the exchange rate would have to be in the vicinity of 34 pesos to a US dollar in order to generate enough export earnings to eliminate the trade deficit. The higher rate will cut down on the least desired imports thus facilitating the elimination of the trade deficit which was close to 50 billion pesos or over 2 billion US dollars in 1989.

This measure of the currency's overvaluation has to be interpreted in the proper context of the model. One point to raise in this regard is that the model is one of full employment. If the calibrated model incorporated surplus labor then the exchange rate needs not go up by 20 percent to close the trade deficit. The adjustment to obtain a balance of payments falls also on a reduction in labor unemployment or underemployment. Hence the reallocation of labor resources in non-export oriented sectors needs not decrease as much as reflected by the 20 percent depreciation of the exchange rate.

Another point is that in this simulation all of the observed capital inflows in 1989 were withdrawn. There is no strong reason to believe that 1989 is a typical year as far as capital inflows are concerned. But certainly it is not also true that all of the 1989 inflows were an aberration. A percent of the amount must be part of the normal flows which come into the country every year. Thus the measure of a 20 percent overvaluation of the domestic currency must be regarded as being on the high side of the actual overvaluation because of the normal capital flows.

Effects of Correcting For The Trade Deficit

In this we discuss the economic effects of withdrawing the capital inflows gross of external debt service and instead allowing the exchange rate to adjust in order to eliminate the 1989 trade deficit. The exercise is done holding the real income of the economy constant. The benchmark data reflects equilibrium in the country's balance of payments. The gross capital inflows and changes in the country's international reserves made up for the trade gap. Withdrawal of these inflows will certainly reduce the aggregate real income in the economy, these being treated in a static model as transfers from the rest of the world. Lump sum compensation of the consumers in the model is required to make them as well off as in the presence of the capital inflows. What is therefore attempted here is the utility constant effect of substituting capital inflows with export earnings induced by a depreciation of the exchange rate.

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Table 9 shows the effects on local production as a result of this devaluation. Most of the gains in production go to the non-agricultural sectors. Recall that the local production activities in the model produce both the import substitute and the exported goods. This feature was modelled using the product transformation function. Thus the fact that the devaluation helped the production of the non-agricultural sectors may simply be a reflection of another fact that the high value exports are the non-traditional and import intensive non-agricultural sectors. Except for mining and fishing, all primary sectors stand to lose resources as a result of the currency devaluation.

The results in Table 9 merely confirm that as in 1989 non-agricultural sectors were producing the top exports in the country and intensive in imports as well. With the devaluation, imports contract being replaced with domestic products while exports increase. Both effects imply that domestic production has to increase in the non-agricultural sectors.

The decline in production of primary sectors should be understood as a medium run phenomenon, however. In this exercise, resources are fully employed and are not increased in the process of devaluation. Thus, with resources shifted away from agricultural to non-agricultural sectors, the former are bound to contract. In reality however, the country has a lot of surplus resources particularly in the agricultural sectors which are not captured in this version of the model. Because of these unused resources, it is very likely that the decline in production in the

primary sectors may not occur despite the expansion of non-agriculture, because more and more of previously unused resources may simply get employed as a result.

Table 10 shows the effects on the domestic prices of four sets of goods. They are producer goods, consumer/user goods, imports and exports. The last two sets of tradable goods experience a uniform increase in prices of close to 20%. This is the percentage devaluation required to eliminate the trade deficit. With respect to non-tradables, the larger percentage increases of prices are in the non-agricultural sectors. This has to be in order to attract resources into these sectors and effect the increases in outputs as reported in Table 9 above.

It is important to state here that these price increases are not part of an inflationary process. These are one-time adjustments in domestic prices resulting from the devaluation in the currency. But this does not also rule out that the possibility that these adjustments will trigger an inflation. But the realization of this depends upon what happens after the devaluation. Will the labor sector defend its real income and will nominal wages rise? Will the money supply increase to accommodate the wage demands of the labor sector? If none of these or similar measures are undertaken, then prices remain where they are after these adjustments.

Table 11 shows the effects on the prices of fixed and variable factors. The shadow prices of fixed factors in each of twelve sectors of the model increase with the larger ones occurring in the

non-agricultural sectors. Again this is consistent with the pattern of production increases shown in Table 9. Machineries and transport equipment lead the industrial sectors in profit increases -- 27 percent. Variable factor services also increase but at smaller rates compared to industrial profits. Wages rise by close to 7 percent while the rental rates of variable capital go up by close to 9 percent.

Again it should be pointed out here that the increase in wages and capital services depend upon the extent of underutilization of labor and capital services in the economy at the time of the devaluation. Take the case of labor services. There is obviously a widespread underutilization of labor. Therefore the wage increase which the model predicts may be moderated by the additional utilization of the labor force in the economy following the devaluation. The same is true with fixed factors. In some industries, the capacity utilization rates are sub-optimal. This is due to deficiency in demand for the sector's products. Since the devaluation creates markets for the country's products, it is quite likely that production increases may occur even before profits have increased by the magnitudes suggested by the simulation results.

Table 12 shows the effects of the devaluation on the volume of imports and exports. Obviously imports decline and exports increase. It appears that the import substitution process is stronger in the agricultural sector. Imports there decline at a faster rate than those in the industrial sector. This may be

explained by the relatively greater import intensity of industrial exports. To generate exports, the industrial producers have to import materials and this moderates the decline in the import bill from the industrial sectors. It should be pointed out that these percentage increases are applied on an import base which is larger for industry than for agriculture. Imports of resource industries do not fall as much as those in other sectors because of the crude petroleum requirements of the economy.

Industrial exports increase at a faster rate than those in the agricultural sectors. Adding up the percentage changes in imports and exports, one gets the percentage contribution of the sector to reducing the trade deficit. The trade deficit contribution of the sector is the net imports of that sector. The change in the sector's trade deficit is the sum of the percentage decline in imports minus the percentage increase in the exports. Based on this index, the agricultural sectors help relatively more in reducing the country's trade deficit than the industrial sectors. Again, this may be explained by the relative import intensity of the industrial exports.

Effects of Correcting for The Tariff Protection

The purpose of this set of model simulations is to ask what would happen to the exchange rate if the country did not impose tariff restrictions on imports. These restrictions lower the demand for imports and penalize exports. This is another measure of the overvaluation of the exchange rate. The price of the local

currency in terms of goods is reduced as a result of the tariff protection. Thus the simulation that is undertaken here will measure to what extent the currency is overvalued by tariff protection and the economic effects of correcting for this type of overvaluation.

The key result is that the exchange rate has to be devalued by about 11 percent if tariff policies are removed and exports have to be increased to pay for the large import bill induced by tariff liberalization. If the exchange rate now is 28 pesos to a US dollar, then the tariff protection policies in the country have overvalued the domestic currency by about 3 pesos.

The analysis was undertaken while holding the amount of capital flows constant. If those flows were lower, then the tariff protection policies would have implied a larger distortion in the domestic value of the currency.

The welfare levels of the consumers and government were also controlled in the analysis. The result is utility-compensated. The removal of the tariff restrictions will increase the overall efficiency of the economy since the latter is a price-taker in world markets. The efficiency gains of such a liberalization measure were therefore taken away from the consumers in this utility-constant analysis.

The economic effects of the devaluation are of a similar nature as those in the first case of correcting for the trade deficit. These are shown from Tables 13 to 16. Key differences are that imports increase instead of contract as in the case of the

first exercise on trade deficit. Import prices also go down reflecting the removal of sector-specific tariff rates. The increase in exports is not as much as comparable to that in exports in the trade deficit simulation because of the capital flows. That is part of the trade deficit is still accommodated by the capital flows in this second exercise involving tariff restrictions.

Effects on the Government's Fiscal Deficit

Table 17 shows the effect on the devaluation of selected fiscal variables. Customs duty collections increase by 8 percent as a result of the currency devaluation required to correct the country's trade deficit. Excise Taxes also increase by about 4 to 5 percent.

The national government's fiscal deficit results have to be interpreted in the following way. The numbers in the table indicate that the deficit increases by about 314 percent. In all these exercises, we are holding real government spending constant. A lump sum tax is imposed on the private sector to pay for the deficit of the government. The resulting deficit when the currency is devalued to correct for the trade deficit is 82.19 billion pesos. Now recall the capital flows into the economy were withdrawn in the simulation. The government can charge this deficit of 82.19 billion pesos against the capital flows amounting to 63.59 billion pesos. Subtracting the two, we obtain a deficit of 18.60 billion pesos. This implies that the fiscal deficit is reduced by 1.24 billion pesos or by 6.25 percent.

The correction for the overvaluation of the currency due to tariff protection results in an increase in the fiscal deficit by about 205 percent. Again this figure has to be interpreted correctly. Recall that these exercises involved lifting the country's tariffs which therefore take away about 38 billion pesos from the government's income. If a lump sum tax is imposed to recover this amount then this implies that the fiscal deficit after the devaluation is only 22.14 billion pesos valued at the official exchange rate of 28 pesos. This implies that the trade deficit increases by 2.53 billion pesos or by 12.8 percent.

3.5 Concluding Remarks

This paper developed a computable general framework for analyzing the effects of a currency devaluation. The model is able to measure the extent of overvaluation of the domestic currency due to an externally-accommodated trade deficit and the tariff protection policies.

This study concludes that the domestic currency is overvalued by about 25 percent. Thus if the current exchange rate is 28 pesos to a US dollar, the exchange rate would have to be 34 pesos. The 25 percent is to account for both the trade deficit and tariff protection policy. The trade deficit is largely financed with capital inflows. If it is going to be closed using the country's resources through higher export earnings and a lower import bill the exchange rate would have to depreciate by about 20 percent. Now there are normal capital inflows every year and so the figure

of 20 percent may be an overestimate of the actual required correction. The tariff policies of the country also overvalue the domestic currency by 10 percent based on the results of the simulation done in this study. The country cannot do away with all of its tariff policies, these being a major source of its tax revenues and simple to administer. Given these caveats, the domestic currency may be overvalued between 20 to 30 percent.

The effects of a currency devaluation on production, prices, trade flows, and the fiscal deficit were also computed in this study.

Table 3.1
Correspondence Between the 12-Sector CGE Model
and the 1983 Input-Output Table

Code	Description	1983 I-O Code
01	Crops	1-13,18
02	Livestock and Poultry	14-17
03	Fishery	19-20
04	Resource Industries	21-27
05	Agricultural Processing	28-50
06	Textile, Apparel and Leather	51-55,62
07	Wood,Paper & Rubber	56-61,92-93 63-66
08	Chemicals	67-75
09	Petroleum Products	76
10	Machineries and Transport Equipment	83-91
11	Other Industries	77-82,94-96
12	Services	97-126

Table 3.2
Components of Value Added, By Sector: 1989
(In Billion Pesos)

Sector	Labor	Capital Depre-ciation	Indirect Taxes & Transfers	Other Value Added	Total Value Added
Crops	49.19	3.45	17.43	53.37	123.45
Livestock	15.19	2.27	5.82	17.93	41.20
Fishery	15.94	3.68	6.42	19.44	45.49
Resources	7.97	4.99	3.97	11.19	28.11
Ag. Processing	35.02	7.97	15.87	53.51	112.37
Textiles	17.49	4.10	5.12	9.53	36.24
Wood	6.61	1.96	2.35	5.69	16.61
Chemicals	4.59	1.60	2.05	6.30	14.53
Petroleum	0.56	0.70	0.91	4.27	6.44
Machinery	7.51	2.45	2.55	5.56	18.06
Other Ind.	9.28	5.50	4.71	13.87	33.35
Services	182.88	41.31	69.01	195.49	488.68
TOTAL	352.22	79.97	136.20	396.15	964.54

Table 3.3
Inter-industry Transactions: 1989
(in billion pesos)

Sector	1	2	3	4
Crops	14.75	0.46	0.17	0.19
Livestock		6.27		
Fishery			1.25	
Resource	0.00		0.03	1.55
Ag. Proc.		24.04	3.44	0.00
Textiles	0.26		0.22	0.01
Wood	0.33	0.01	0.04	0.19
Chemicals	11.10	0.25	1.03	1.03
Petroleum	0.13	0.04	4.71	4.22
Machinery	0.10	0.00	0.40	1.62
Oth. Ind.	0.03	0.03	0.21	0.82
Services	10.33	2.12	8.14	5.86
Total	37.03	33.23	19.65	15.48

Table 3.3 (con't)
Inter-industry Transactions: 1989
(in billion pesos)

Sector	5	6	7	8
Crops	83.31	2.92	1.19	1.95
Livestock	47.41			
Fishery	7.14		0.00	
Resource	0.06	0.00	8.95	0.44
Ag. Proc.	54.07	0.04	0.04	5.00
Textiles	0.62	38.98	3.34	0.95
Wood	1.31	0.15	16.62	0.55
Chemicals	1.10	3.69	3.78	10.86
Petroleum	3.45	1.47	2.18	1.63
Machinery	0.48	0.09	0.32	0.10
Oth. Ind.	3.03	1.27	2.19	1.28
Services	29.09	7.07	10.80	6.50
Total	231.08	55.69	49.40	29.27

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Table 3.3 (con't)
Inter-industry Transactions: 1989
(in billion pesos)

Sector	9	10	11	12	Total
Crops		0.04	0.01	4.66	109.64
Livestock		0.00		1.91	55.59
Fishery		0.00	0.13	3.40	11.93
Resource	15.96	0.01	2.35	4.82	34.18
Ag. Proc.		0.17	0.00	22.08	108.88
Textiles		0.15	0.12	2.77	47.41
Wood	0.09	0.84	1.21	14.94	36.27
Chemicals	2.36	1.82	0.67	10.68	48.38
Petroleum	0.37	0.90	3.77	36.69	59.55
Machinery	0.03	10.30	0.36	15.93	29.72
Oth. Ind.	0.14	10.81	23.80	46.94	90.56
Services	18.42	5.15	5.17	145.14	253.80
Total	37.36	30.20	37.58	309.95	885.92

Note: A blank cell indicates a zero while a cell with a zero in it represents a number less than .01 billion pesos.

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Table 3.4
Final Demand, by Sector for 1989
(In Billion Pesos)

Sector	Private	Gov't	Exports	Imports	Total
Crops	44.36	0.47	14.47	-12.43	46.87
Livestock	15.80	0.17	0.01	-0.38	15.61
Fishery	41.95	0.43	9.69	-0.94	51.12
Resources	6.48	0.05	13.96	-8.99	11.50
Ag. Pro.	218.19	2.64	28.92	-15.32	234.43
Textiles	40.70	0.75	22.27	-14.09	49.63
Wood	19.26	3.89	20.18	-8.83	34.50
Chemicals	19.00	3.21	9.03	-31.05	0.19
Petroleum	24.03	3.14	3.82	-34.98	-4.00
Machinery	54.63	3.23	30.06	-56.29	31.62
Oth. Ind.	12.26	2.74	17.61	-43.21	-10.60
Services	345.79	151.28	99.70	-93.11	503.66
Total	842.43	172.00	269.73	-319.62	964.54

Table 3.5
External Sector Performance: 1989
(Billion Pesos)

Item	1989
Trade Balance	-56.48
Merchandise exports, fob	170.03
Merchandise imports, fob	226.51
Services	6.59
Inflow	99.70
Outflow	93.11
Transfers	18.04
Inflow	18.09
Outflow	0.04
Current Account, Total	-31.85
Long-Term Loans	8.59
Inflow /a	61.39
Outflow	52.81
Direct Investments	18.57
Inflow	21.13
Outflow	2.57
Short-Term Capital	-1.98
Errors and Omissions	8.02
Capital Account, Total	33.20
Monetization of gold	6.26
Revaluation Adjustments	2.20
OVERALL SURPLUS/DEFICIT	9.80

p - Preliminary
Note: Exchange rate used: $1.00 = P21.70
Source: National Economic and Development Authority
Source: Government of the Philippines, ''Progress Report on the Philippine Agenda for Sustained Growth and Development''

Table 3.6
Revenues of the Philippine Government: 1989
(in billion pesos)

Total revenues	152.40	100.00
Tax Revenues	122.40	80.31
I. Direct Taxes	37.46	24.58
A. corporate enterprise	15.18	9.96
B. Individual	10.96	7.19
C. Bank deposits/ t-bills	10.18	6.68
D. Incremental collections	1.15	0.75
II. Indirect Taxes	78.80	51.70
A. Sales Tax		
B. VAT	10.13	6.65
C. Selective excise on goods	24.85	16.31
D. Selective tax on services	4.60	3.02
E. Taxes on use of property	0.89	0.59
F. Taxes on International Trade & Transactions	38.32	25.14
III. Other Taxes	6.14	4.03
A. Taxes on Property (Transfer tax)	0.12	0.08
B. Travel	0.54	0.35
C. Documentary Stamp Tax	3.08	2.02
D. Miscellaneous	0.51	0.34
D. Collections from Other Offices	1.89	1.24
Non-Tax Income	30.0	19.69

Source: Bureau of Internal Revenue, Comparative BIR Collections, CY-1989-1988;
Department of Budget and Management;
National Statistics Office, 1989 Philippine Yearbook.
Progress Report (Table 4A); see Table 3.5 for complete citation

Table 3.7
Philippine Expenditure and Income Profiles: 1989
(In Billion Pesos)

	Private Sector	Govern-ment	Rest of the World	Total
Panel A: Expenditure Profile				
Current	690.68	89.33	-49.89	730.12
Consumption Exp.	690.68	89.33		
Exports			269.73	
Imports			-319.62	
Capital	151.75	27.97		179.71
Fixed Capital	139.17	27.97		
Construction	58.31	27.97		
Durable Equipment	80.86			
Increase in Stocks	12.58			
Interest Payments		54.70		54.70
Domestic		41.00		
Foreign		13.70		
				0.00
Total	842.43	172.00	-49.89	964.54
Panel B: Income Profile				
Compensation of Employees	724.25	26.01		750.26
Income from Property &				0.00
Entrepreneurship				0.00
Corporate Income	25.16			25.16
Taxes		122.50		122.50
Tariffs		38.32		
Excise		24.85		
VAT		10.13		
Direct & Other Taxes		49.19		
Other Income		11.92		11.92
Transfers	71.62	-8.03	-63.59	63.59
In from Persons		9.63	0.04	9.63
In from Govt	68.53		16.04	68.53
In from ROW	12.77	66.91		79.67
Out to Persons		68.53	12.77	68.53
Out to Govt	9.63		66.91	9.63
Out to ROW	0.04	16.04		16.08
Interest Income	41.00		13.70	41.00
				0.00
Total	862.03	152.40	-49.89	1014.43

Source: Basic Data from the Economic and Social Statistics Office NSCB; also see Tables 3.5 and 3.6

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Table 3.8
Average Indirect Tax Rates: Book and Adjusted Rates
(in percent)

Sector	Tariff Rates		Excise Tax Rates	
	Book	Adjusted	Book	Adjusted
Crops	33.61	21.87	0.00	0.00
Livestock	31.90	20.75	0.00	0.00
Fishery	27.64	17.98	0.00	0.00
Nat. Resources	13.94	9.07	1.32	0.76
Ag. Processing	37.37	24.32	3.04	1.75
Textiles	40.93	26.63	0.00	0.00
Wood,Paper & Rubber	35.16	22.88	0.00	0.00
Chemicals	23.27	15.14	0.00	0.00
Petroleum Refineries	15.75	10.25	8.27	4.76
Machineries	27.61	17.97	0.00	0.00
Other Industries	23.62	15.37	1.72	0.99
Services	0.00	0.00	3.45	1.98

Note: The adjustment factors are approximately 65.07, 18.31 and 57.55 percent, respectively. Adjustment was made to make revenues of the tax measures computed by the model consistent with actual yields of the tax measures.

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Table 3.9
Production Effects of Devaluing The Currency To Eliminate The Trade Deficit
(in percent)

Code	Description	
1	Crops	-1.01
2	Livestock and Poultry	-3.28
3	Fishery	-2.09
4	Resource Industries	6.40
5	Agricultural Processing	-2.65
6	Textile, Apparel & Leather	3.99
7	Wood, Paper & Rubber	5.32
8	Chemicals	4.95
9	Petroleum Products	1.61
10	Machineries & Transport Equipment	11.62
11	Other Industries	6.41
12	Services	-0.59

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Table 3.10
Price Effects of Devaluing The
Currency To Eliminate The Trade Deficit
(in percent)

Code	Description	Producer Goods	Imports	Exports	Consumer Goods
1	Crops	5.19	19.87	19.87	6.59
2	Livestock and Poultry	4.15	19.87	19.87	4.24
3	Fishery	3.65	19.87	19.87	3.96
4	Resource Industries	8.95	19.87	19.87	11.67
5	Agricultural Processing	3.80	19.87	19.87	4.68
6	Textile, Apparel & Leather	5.12	19.87	19.87	7.89
7	Wood, Paper & Rubber	5.57	19.87	19.87	8.03
8	Chemicals	8.46	19.87	19.87	14.22
9	Petroleum Products	9.30	19.87	19.87	14.33
10	Machineries & Transport Equipment	4.03	19.87	19.87	16.13
11	Other Industries	11.71	19.87	19.87	15.70
12	Services	5.96	19.87	19.87	7.63

Table 3.11
Effects on Factor Prices of Devaluing The Currency To Eliminate The Trade Deficit
(in percent)

Code	Description	
	Fixed Factors:	
1	Crops	4.80
2	Livestock and Poultry	0.09
3	Fishery	2.79
4	Resource Industries	20.74
5	Agricultural Processing	0.93
6	Textile, Apparel & Leather	13.42
7	Wood, Paper & Rubber	16.93
8	Chemicals	18.33
9	Petroleum Products	15.72
10	Machineries & Transport Equipment	27.35
11	Other Industries	21.31
12	Services	6.01
	Variable Factors:	
	Labor Services	6.85
	Capital Services	8.71

Table 3.12
Effects on Real Trade Flows of Devaluing
The Currency To Eliminate The Trade Deficit
(in percent)

Code	Description	Imports	Exports
1	Crops	-14.36	11.22
2	Livestock and Poultry	-15.97	11.32
3	Fishery	-17.46	10.39
4	Resource Industries	-6.50	13.18
5	Agricultural Processing	-16.88	10.85
6	Textile, Apparel & Leather	-11.86	14.61
7	Wood, Paper & Rubber	-10.91	14.85
8	Chemicals	-7.20	13.36
9	Petroleum Products	-8.16	10.48
10	Machineries & Transport Equipment	-11.57	17.42
11	Other Industries	-2.72	12.01
12	Services	-13.75	10.39

Table 3.13
Production Effects of Devaluing The
Currency Overvalued by Tariff Restrictions
(in percent)

Code	Description	
1	Crops	-1.64
2	Livestock and Poultry	-1.22
3	Fishery	-1.02
4	Resource Industries	0.80
5	Agricultural Processing	-0.89
6	Textile, Apparel & Leather	2.95
7	Wood, Paper & Rubber	3.62
8	Chemicals	0.06
9	Petroleum Products	-1.00
10	Machineries & Transport Equipment	14.92
11	Other Industries	0.81
12	Services	-0.18

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Table 3.14
Price Effects of Devaluing The
Currency Overvalued by Tariff Restrictions
(in percent)

Code	Description	Producer Goods	Consumer Goods	Imports	Exports
1	Crops	5.92	4.28	-9.21	10.64
2	Livestock	6.44	6.33	-8.37	10.64
3	Fishery	6.27	6.00	-6.22	10.64
4	Resource Industries	5.93	4.75	1.44	10.64
5	Agri. Proc.	5.46	4.42	-11.00	10.64
6	Textile, Apparel & Leather	1.97	-1.11	-12.63	10.64
7	Wood, Paper & Rubber	1.74	-0.48	-9.96	10.64
8	Chemicals	3.08	-0.60	-3.91	10.64
9	Petroleum Products	5.09	2.76	0.36	10.64
10	Machineries & Transport Equipment	-2.74	-5.45	-6.21	10.64
11	Other Industries	3.30	-0.44	-4.10	10.64
12	Services	6.43	6.95	10.64	10.64

Table 3.15
Effects on Factor Prices of Devaluing The Currency Overvalued by Tariff Restrictions
(in percent)

Code	Description	
	Fixed Factors:	
1	Crops	5.54
2	Livestock and Poultry	6.48
3	Fishery	7.00
4	Resource Industries	11.01
5	Agricultural Processing	7.05
6	Textile, Apparel & Leather	13.89
7	Wood, Paper & Rubber	15.90
8	Chemicals	9.41
9	Petroleum Products	4.77
10	Machineries & Transport Equipment	35.70
11	Other Industries	11.07
12	Services	8.83
	Variable Factors:	
	Labor	9.06
	Capital	9.86

Table 3.16
Effects on Real Trade Flows of Devaluing
The Currency Overvalued by Tariff Restrictions
(in percent)

Code	Description	Imports	Exports
1	Crops	14.25	2.30
2	Livestock and Poultry	14.74	2.68
3	Fishery	11.44	2.39
4	Resource Industries	3.71	3.73
5	Agricultural Processing	16.95	3.53
6	Textile, Apparel & Leather	17.72	9.45
7	Wood, Paper & Rubber	14.10	9.81
8	Chemicals	5.64	5.71
9	Petroleum Products	3.19	3.74
10	Machineries & Transport Equ	9.75	20.39
11	Other Industries	6.58	5.97
12	Services	-4.51	3.21

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APPENDIX
THE CGE-EXCHANGE RATE MODEL

```
*****************************************************************
$MODEL:          exrt
*****************************************************************
*CREATED 4-30-91
$ITLIMT: 0
$BELL: .FALSE.
*
$SECTORS:
*
 YU-PRI     8.42428E+02     YU-GOV     1.58297E+02
*

 YP-CRPS    1.34278E+02     YC-CRPS    1.49422E+02
 YP-LIVE    7.02875E+01     YC-LIVE    7.07485E+01
 YP-FISH    5.27023E+01     YC-FISH    5.38078E+01
 YP-NATR    2.81549E+01     YC-NATR    3.82274E+01
 YP-AGPR    3.06306E+02     YC-AGPR    3.30919E+02
 YP-TEXT    7.21946E+01     YC-TEXT    9.00349E+01
 YP-WOOD    4.91418E+01     YC-WOOD    5.99939E+01
 YP-CHEM    3.33566E+01     YC-CHEM    6.91041E+01
 YP-PETR    4.05649E+01     YC-PETR    8.28312E+01
 YP-MACH    1.91129E+01     YC-MACH    8.55213E+01
 YP-OTHI    5.04955E+01     YC-OTHI    1.01323E+02
 YP-SERV    6.40985E+02     YC-SERV    7.48441E+02
*
 M-CRPS     1.51440E+01     X-CRPS     1.44677E+01
 M-LIVE     4.61017E-01     X-LIVE     1.45915E-02
 M-FISH     1.10553E+00     X-FISH     9.68787E+00
 M-NATR     9.80286E+00     X-NATR     1.39628E+01
 M-AGPR     1.90463E+01     X-AGPR     2.89155E+01
 M-TEXT     1.78404E+01     X-TEXT     2.22672E+01
 M-WOOD     1.08521E+01     X-WOOD     2.01847E+01
 M-CHEM     3.57476E+01     X-CHEM     9.03342E+00
 M-PETR     3.85702E+01     X-PETR     3.82105E+00
 M-MACH     6.64084E+01     X-MACH     3.00622E+01
 M-OTHI     4.98507E+01     X-OTHI     1.76115E+01
 M-SERV     9.31124E+01     X-SERV     9.96996E+01
*

$COMMODITIES:
*
 MONEY      1.00000E+00
 FOREX      1.00000E+00     U-PRI      1.00000E+00
 VF-LABOR   1.00000E+00     U-GOV      1.00000E+00
 VF-CAPIT   1.00000E+00
*
 FF-CRPS    1.00000E+00     PG-CRPS    1.00000E+00
 FF-LIVE    1.00000E+00     PG-LIVE    1.00000E+00
 FF-FISH    1.00000E+00     PG-FISH    1.00000E+00
```

```
 FF-NATR    1.00000E+00      PG-NATR     1.00000E+00
 FF-AGPR    1.00000E+00      PG-AGPR     1.00000E+00
 FF-TEXT    1.00000E+00      PG-TEXT     1.00000E+00
 FF-WOOD    1.00000E+00      PG-WOOD     1.00000E+00
 FF-CHEM    1.00000E+00      PG-CHEM     1.00000E+00
 FF-PETR    1.00000E+00      PG-PETR     1.00000E+00
 FF-MACH    1.00000E+00      PG-MACH     1.00000E+00
 FF-OTHI    1.00000E+00      PG-OTHI     1.00000E+00
 FF-SERV    1.00000E+00      PG-SERV     1.00000E+00
*
 PM-CRPS    1.00000E+00      PX-CRPS     1.00000E+00
 PM-LIVE    1.00000E+00      PX-LIVE     1.00000E+00
 PM-FISH    1.00000E+00      PX-FISH     1.00000E+00
 PM-NATR    1.00000E+00      PX-NATR     1.00000E+00
 PM-AGPR    1.00000E+00      PX-AGPR     1.00000E+00
 PM-TEXT    1.00000E+00      PX-TEXT     1.00000E+00
 PM-WOOD    1.00000E+00      PX-WOOD     1.00000E+00
 PM-CHEM    1.00000E+00      PX-CHEM     1.00000E+00
 PM-PETR    1.00000E+00      PX-PETR     1.00000E+00
 PM-MACH    1.00000E+00      PX-MACH     1.00000E+00
 PM-OTHI    1.00000E+00      PX-OTHI     1.00000E+00
 PM-SERV    1.00000E+00      PX-SERV     1.00000E+00
*
 CG-CRPS    1.00000E+00       CG-LIVE    1.00000E+00
 CG-FISH    1.00000E+00       CG-NATR    1.00000E+00
 CG-AGPR    1.00000E+00       CG-TEXT    1.00000E+00
 CG-WOOD    1.00000E+00       CG-CHEM    1.00000E+00
 CG-PETR    1.00000E+00       CG-MACH    1.00000E+00
 CG-OTHI    1.00000E+00       CG-SERV    1.00000E+00
*

$AUXILLARY:
 LAMBDA     0.00000E+00
 TAU-PRI    8.42428E+02      TAU-GOV     1.58297E+02
 RHO-GOV    0.00000E+00      DIRTAX      4.91928E+01
 TTR-GOV    3.83200E+01
 STR-GOV    2.48527E+01      GTRANS      5.89000E+01
 DEFICIT    1.96000E+01      EXDEBT      1.37000E+01
*

$CONSUMERS:
 PRI
 GOV
 GOV-FXR
 TREASURY
 CUSTOMS
 IRS-STAX

*
$PROD: YU-PRI  t:1.0   s:0.0  a: 1.0
    O:U-PRI    X: 1.00000E+00 P: 1.0
+A: TREASURY  T:   5.00000E-01
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    I:CG-CRPS  X: 5.26526E-02 P: 1.0
    I:CG-LIVE  X: 1.87591E-02 P: 1.0
    I:CG-FISH  X: 4.97928E-02 P: 1.0
    I:CG-NATR  X: 7.68804E-03 P: 1.0
    I:CG-AGPR  X: 2.59000E-01 P: 1.0
    I:CG-TEXT  X: 4.83142E-02 P: 1.0
    I:CG-WOOD  X: 2.28603E-02 P: 1.0
    I:CG-CHEM  X: 2.25489E-02 P: 1.0
    I:CG-PETR  X: 2.85203E-02 P: 1.0
    I:CG-MACH  X: 6.48428E-02 P: 1.0
    I:CG-OTHI  X: 1.45482E-02 P: 1.0
    I:CG-SERV  X: 4.10473E-01 P: 1.0
*
$PROD: YU-GOV  t:1.0   s:0.0  a: 1.0
    O:U-GOV    X: 1.00000E+00 P: 1.0
+A: TREASURY  T:   5.00000E-01
    I:CG-CRPS  X: 2.74204E-03 P: 1.0
    I:CG-LIVE  X: 1.00232E-03 P: 1.0
    I:CG-FISH  X: 2.47269E-03 P: 1.0
    I:CG-NATR  X: 3.06878E-04 P: 1.0
    I:CG-AGPR  X: 1.53638E-02 P: 1.0
    I:CG-TEXT  X: 4.35149E-03 P: 1.0
    I:CG-WOOD  X: 2.26052E-02 P: 1.0
    I:CG-CHEM  X: 1.86666E-02 P: 1.0
    I:CG-PETR  X: 1.82493E-02 P: 1.0
    I:CG-MACH  X: 1.87593E-02 P: 1.0
    I:CG-OTHI  X: 1.59444E-02 P: 1.0
    I:CG-SERV  X: 8.79536E-01 P: 1.0
*

$PROD: YP-CRPS  t:1.0   s:0.0  a: 1.0
    O:PG-CRPS  X: 9.02735E-01 P: 1.0
    O:PX-CRPS  X: 9.72646E-02 P: 1.0
    I:VF-LABOR X: 3.50352E-01 P: 1.0 a:
    I:VF-CAPIT X: 2.45739E-02 P: 1.0 a:
    I:FF-CRPS  X: 3.80122E-01 P: 1.0 a:
    I:CG-CRPS  X: 9.44050E-02 P: 1.0
    I:CG-LIVE  X: 0.00000E+00 P: 1.0
    I:CG-FISH  X: 0.00000E+00 P: 1.0
    I:CG-NATR  X: 2.68074E-06 P: 1.0
    I:CG-AGPR  X: 0.00000E+00 P: 1.0
    I:CG-TEXT  X: 1.50157E-03 P: 1.0
    I:CG-WOOD  X: 2.22515E-03 P: 1.0
    I:CG-CHEM  X: 7.13382E-02 P: 1.0
    I:CG-PETR  X: 8.63873E-04 P: 1.0
    I:CG-MACH  X: 6.35649E-04 P: 1.0
    I:CG-OTHI  X: 2.23253E-04 P: 1.0
    I:CG-SERV  X: 7.37571E-02 P: 1.0
*

$PROD: YP-LIVE  t:1.0   s:0.0  a: 1.0
    O:PG-LIVE  X: 9.99792E-01 P: 1.0
```


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    I:VF-LABOR X: 2.28332E-01 P: 1.0 a:
    I:VF-CAPIT X: 3.41532E-02 P: 1.0 a:
    I:FF-LIVE  X: 2.70152E-01 P: 1.0 a:
    I:CG-CRPS  X: 5.95568E-03 P: 1.0
    I:CG-LIVE  X: 8.50756E-02 P: 1.0
    I:CG-FISH  X: 0.00000E+00 P: 1.0
    I:CG-NATR  X: 0.00000E+00 P: 1.0
    I:CG-AGPR  X: 3.40505E-01 P: 1.0
    I:CG-TEXT  X: 0.00000E+00 P: 1.0
    I:CG-WOOD  X: 1.30740E-04 P: 1.0
    I:CG-CHEM  X: 3.32880E-03 P: 1.0
    I:CG-PETR  X: 5.29676E-04 P: 1.0
    I:CG-MACH  X: 4.80368E-05 P: 1.0
    I:CG-OTHI  X: 4.62351E-04 P: 1.0
    I:CG-SERV  X: 3.08270E-02 P: 1.0
*

$PROD: YP-FISH  t:1.0   s:0.0  a: 1.0
    O:PG-FISH  X: 8.44721E-01 P:  1.0
    O:PX-FISH  X: 1.55279E-01 P:  1.0
    I:VF-LABOR X: 2.70719E-01 P:  1.0 a:
    I:VF-CAPIT X: 6.24945E-02 P:  1.0 a:
    I:FF-FISH  X: 3.30121E-01 P:  1.0 a:
    I:CG-CRPS  X: 2.76119E-03 P:  1.0
    I:CG-LIVE  X: 0.00000E+00 P:  1.0
    I:CG-FISH  X: 2.06322E-02 P:  1.0
    I:CG-NATR  X: 4.32165E-04 P:  1.0
    I:CG-AGPR  X: 6.02533E-02 P:  1.0
    I:CG-TEXT  X: 3.18718E-03 P:  1.0
    I:CG-WOOD  X: 6.76712E-04 P:  1.0
    I:CG-CHEM  X: 1.65922E-02 P:  1.0
    I:CG-PETR  X: 7.65093E-02 P:  1.0
    I:CG-MACH  X: 6.28303E-03 P:  1.0
    I:CG-OTHI  X: 3.46194E-03 P:  1.0
    I:CG-SERV  X: 1.45876E-01 P:  1.0
*

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    O:PG-NATR  X: 6.67372E-01 P: 1.0
    O:PX-NATR  X: 3.32628E-01 P: 1.0
    I:VF-LABOR X: 2.01035E01  P: 1.0 a:
    I:VF-CAPIT X: 1.25954E-01 P: 1.0 a:
    I:FF-NATR  X: 2.82324E-01 P: 1.0 a:
    I:CG-CRPS  X: 4.53107E-03 P: 1.0 S: 0.00000E+00
    I:CG-LIVE  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-FISH  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-NATR  X: 3.47366E-02 P: 1.0 S: 1.14035E-02
    I:CG-AGPR  X: 1.04719E-05 P: 1.0 S: 1.59649E-02
    I:CG-TEXT  X: 2.74580E-04 P: 1.0 S: 1.59649E-02
    I:CG-WOOD  X: 4.68774E-03 P: 1.0 S: 1.59649E-02
    I:CG-CHEM  X: 2.50934E-02 P: 1.0 S: 1.24172E-02
```

```
    I:CG-PETR  X: 1.03677E-01 P: 1.0 S: 0.00000E+00
    I:CG-MACH  X: 3.84152E-02 P: 1.0 S: 1.59649E-02
    I:CG-OTHI  X: 2.03358E-02 P: 1.0 S: 1.59649E-02
    I:CG-SERV  X: 1.58926E-01 P: 1.0 S: 1.59649E-02
*

$PROD: YP-AGPR  t:1.0   s:0.0  a: 1.0
    O:PG-AGPR  X: 9.12870E-01 P: 1.0 T:  1.59649E-02
    O:PX-AGPR  X: 8.71297E-02 P: 1.0
    I:VF-LABOR X: 1.11803E-01 P: 1.0 a:
    I:VF-CAPIT X: 2.54365E-02 P: 1.0 a:
    I:FF-AGPR  X: 1.70828E-01 P: 1.0 a:
    I:CG-CRPS  X: 2.38560E-01 P: 1.0 S: 0.00000E+00
    I:CG-LIVE  X: 1.41768E-01 P: 1.0 S: 0.00000E+00
    I:CG-FISH  X: 2.10065E-02 P: 1.0 S: 0.00000E+00
    I:CG-NATR  X: 1.71058E-04 P: 1.0 S: 1.14035E-02
    I:CG-AGPR  X: 1.68630E-01 P: 1.0 S: 1.59649E-02
    I:CG-TEXT  X: 1.63855E-03 P: 1.0 S: 1.59649E-02
    I:CG-WOOD  X: 3.90201E-03 P: 1.0 S: 1.59649E-02
    I:CG-CHEM  X: 3.17542E-03 P: 1.0 S: 1.24172E-02
    I:CG-PETR  X: 9.99736E-03 P: 1.0 S: 0.00000E+00
    I:CG-MACH  X: 1.33287E-03 P: 1.0 S: 1.59649E-02
    I:CG-OTHI  X: 8.82358E-03 P: 1.0 S: 1.59649E-02
    I:CG-SERV  X: 9.29278E-02 P: 1.0 S: 1.59649E-02
*

$PROD: YP-TEXT  t:1.0   s:0.0  a: 1.0
    O:PG-TEXT  X: 7.63605E-01 P: 1.0 T:  1.59649E-02
    O:PX-TEXT  X: 2.36395E-01 P: 1.0
    I:VF-LABOR X: 1.96729E-01 P: 1.0 a:
    I:VF-CAPIT X: 4.60789E-02 P: 1.0 a:
    I:FF-TEXT  X: 1.07207E-01 P: 1.0 a:
    I:CG-CRPS  X: 3.55899E-02 P: 1.0 S: 0.00000E+00
    I:CG-LIVE  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-FISH  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-NATR  X: 1.15603E-07 P: 1.0 S: 1.14035E-02
    I:CG-AGPR  X: 5.01795E-04 P: 1.0 S: 1.59649E-02
    I:CG-TEXT  X: 4.35830E-01 P: 1.0 S: 1.59649E-02
    I:CG-WOOD  X: 1.93869E-03 P: 1.0 S: 1.59649E-02
    I:CG-CHEM  X: 4.51462E-02 P: 1.0 S: 1.24172E-02
    I:CG-PETR  X: 1.80974E-02 P: 1.0 S: 0.00000E+00
    I:CG-MACH  X: 1.07223E-03 P: 1.0 S: 1.59649E-02
    I:CG-OTHI  X: 1.57051E-02 P: 1.0 S: 1.59649E-02
    I:CG-SERV  X: 9.61036E-02 P: 1.0 S: 1.59649E-02
*

$PROD: YP-WOOD  t:1.0   s:0.0  a: 1.0
    O:PG-WOOD  X: 7.08711E-01 P: 1.0 T:  1.59649E-02
    O:PX-WOOD  X: 2.91289E-01 P: 1.0
    I:VF-LABOR X: 1.01060E-01 P: 1.0 a:
    I:VF-CAPIT X: 2.99851E-02 P: 1.0 a:
    I:FF-WOOD  X: 8.70273E-02 P: 1.0 a:
```


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    I:CG-CRPS  X: 1.83769E-02 P: 1.0 S: 0.00000E+00
    I:CG-LIVE  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-FISH  X: 5.16768E-05 P: 1.0 S: 0.00000E+00
    I:CG-NATR  X: 1.28188E-01 P: 1.0 S: 1.14035E-02
    I:CG-AGPR  X: 6.06487E-04 P: 1.0 S: 1.59649E-02
    I:CG-TEXT  X: 4.74772E-02 P: 1.0 S: 1.59649E-02
    I:CG-WOOD  X: 2.68426E-01 P: 1.0 S: 1.59649E-02
    I:CG-CHEM  X: 5.88403E-02 P: 1.0 S: 1.24172E-02
    I:CG-PETR  X: 3.40762E-02 P: 1.0 S: 0.00000E+00
    I:CG-MACH  X: 4.78455E-03 P: 1.0 S: 1.59649E-02
    I:CG-OTHI  X: 3.45104E-02 P: 1.0 S: 1.59649E-02
    I:CG-SERV  X: 1.86590E-01 P: 1.0 S: 1.59649E-02
*

$PROD: YP-CHEM  t:1.0   s:0.0  a: 1.0
    O:PG-CHEM  X: 7.86684E-01 P: 1.0 T:  1.24172E-02
    O:PX-CHEM  X: 2.13316E-01 P: 1.0
    I:VF-LABOR X: 1.14768E-01 P: 1.0 a:
    I:VF-CAPIT X: 3.99675E-02 P: 1.0 a:
    I:FF-CHEM  X: 1.57508E-01 P: 1.0 a:
    I:CG-CRPS  X: 4.40454E-02 P: 1.0 S: 0.00000E+00
    I:CG-LIVE  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-FISH  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-NATR  X: 9.27861E-03 P: 1.0 S: 1.14035E-02
    I:CG-AGPR  X: 1.22932E-01 P: 1.0 S: 1.59649E-02
    I:CG-TEXT  X: 1.97686E-02 P: 1.0 S: 1.59649E-02
    I:CG-WOOD  X: 1.30249E-02 P: 1.0 S: 1.59649E-02
    I:CG-CHEM  X: 2.46213E-01 P: 1.0 S: 1.24172E-02
    I:CG-PETR  X: 3.71168E-02 P: 1.0 S: 0.00000E+00
    I:CG-MACH  X: 2.15253E-03 P: 1.0 S: 1.59649E-02
    I:CG-OTHI  X: 2.94549E-02 P: 1.0 S: 1.59649E-02
    I:CG-SERV  X: 1.63770E-01 P: 1.0 S: 1.59649E-02
*

$PROD: YP-PETR  t:1.0   s:0.0  a: 1.0
    O:PG-PETR  X: 9.13913E-01 P: 1.0 T:  0.00000E+00
    O:PX-PETR  X: 8.60870E-02 P: 1.0
    I:VF-LABOR X: 1.32496E-02 P: 1.0 a:
    I:VF-CAPIT X: 1.67385E-02 P: 1.0 a:
    I:FF-PETR  X: 1.01930E-01 P: 1.0 a:
    I:CG-CRPS  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-LIVE  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-FISH  X: 0.00000E+00 P: 1.0 S: 0.00000E+00
    I:CG-NATR  X: 3.34411E-01 P: 1.0 S: 1.14035E-02
    I:CG-AGPR  X: 0.00000E+00 P: 1.0 S: 1.59649E-02
    I:CG-TEXT  X: 0.00000E+00 P: 1.0 S: 1.59649E-02
    I:CG-WOOD  X: 2.05477E-03 P: 1.0 S: 1.59649E-02
    I:CG-CHEM  X: 5.36580E-02 P: 1.0 S: 1.24172E-02
    I:CG-PETR  X: 8.44527E-03 P: 1.0 S: 0.00000E+00
    I:CG-MACH  X: 6.84038E-04 P: 1.0 S: 1.59649E-02
    I:CG-OTHI  X: 3.16147E-03 P: 1.0 S: 1.59649E-02
    I:CG-SERV  X: 4.65668E-01 P: 1.0 S: 1.59649E-02
```


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*

$PROD: YP-MACH  t:1.0   s:0.0  a: 1.0
    O:PG-MACH  X: 3.91077E-01 P:  1.0 T:  1.59649E-02
    O:PX-MACH  X: 6.08923E-01 P:  1.0
    I:VF-LABOR X: 1.61139E-01 P:  1.0 a:
    I:VF-CAPIT X: 5.24705E-02 P:  1.0 a:
    I:FF-MACH  X: 1.19282E-01 P:  1.0 a:
    I:CG-CRPS  X: 8.36009E-04 P:  1.0 S: 0.00000E+00
    I:CG-LIVE  X: 1.57395E-05 P:  1.0 S: 0.00000E+00
    I:CG-FISH  X: 6.04741E-05 P:  1.0 S: 0.00000E+00
    I:CG-NATR  X: 1.68323E-04 P:  1.0 S: 1.14035E-02
    I:CG-AGPR  X: 4.03314E-03 P:  1.0 S: 1.59649E-02
    I:CG-TEXT  X: 3.02182E-03 P:  1.0 S: 1.59649E-02
    I:CG-WOOD  X: 1.90507E-02 P:  1.0 S: 1.59649E-02
    I:CG-CHEM  X: 3.95018E-02 P:  1.0 S: 1.24172E-02
    I:CG-PETR  X: 1.96584E-02 P:  1.0 S: 0.00000E+00
    I:CG-MACH  X: 2.18408E-01 P:  1.0 S: 1.59649E-02
    I:CG-OTHI  X: 2.37835E-01 P:  1.0 S: 1.59649E-02
    I:CG-SERV  X: 1.24518E-01 P:  1.0 S: 1.59649E-02
*

$PROD: YP-OTHI  t:1.0   s:0.0  a: 1.0
    O:PG-OTHI  X: 7.40359E-01 P:  1.0 T:  1.59649E-02
    O:PX-OTHI  X: 2.59641E-01 P:  1.0
    I:VF-LABOR X: 1.44866E-01 P:  1.0 a:
    I:VF-CAPIT X: 8.59461E-02 P:  1.0 a:
    I:FF-OTHI  X: 2.16552E-01 P:  1.0 a:
    I:CG-CRPS  X: 1.51230E-04 P:  1.0 S: 0.00000E+00
    I:CG-LIVE  X: 0.00000E+00 P:  1.0 S: 0.00000E+00
    I:CG-FISH  X: 1.91095E-03 P:  1.0 S: 0.00000E+00
    I:CG-NATR  X: 3.12157E-02 P:  1.0 S: 1.14035E-02
    I:CG-AGPR  X: 3.33913E-05 P:  1.0 S: 1.59649E-02
    I:CG-TEXT  X: 1.55489E-03 P:  1.0 S: 1.59649E-02
    I:CG-WOOD  X: 1.81126E-02 P:  1.0 S: 1.59649E-02
    I:CG-CHEM  X: 9.59887E-03 P:  1.0 S: 1.24172E-02
    I:CG-PETR  X: 5.47711E-02 P:  1.0 S: 0.00000E+00
    I:CG-MACH  X: 5.06580E-03 P:  1.0 S: 1.59649E-02
    I:CG-OTHI  X: 3.47350E-01 P:  1.0 S: 1.59649E-02
    I:CG-SERV  X: 8.28719E-02 P:  1.0 S: 1.59649E-02
*

$PROD: YP-SERV  t:1.0   s:0.0  a: 1.0
    O:PG-SERV  X: 8.64255E-01 P:  1.0 T:  1.59649E-02
    O:PX-SERV  X: 1.35745E-01 P:  1.0
    I:VF-LABOR X: 2.63778E-01 P:  1.0 a:
    I:VF-CAPIT X: 5.95887E-02 P:  1.0 a:
    I:FF-SERV  X: 2.81970E-01 P:  1.0 a:
    I:CG-CRPS  X: 5.57541E-03 P:  1.0 S: 0.00000E+00
    I:CG-LIVE  X: 2.39124E-03 P:  1.0 S: 0.00000E+00
    I:CG-FISH  X: 4.18621E-03 P:  1.0 S: 0.00000E+00
    I:CG-NATR  X: 5.33055E-03 P:  1.0 S: 1.14035E-02
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    I:CG-AGPR  X: 2.87845E-02 P:  1.0 S: 1.59649E-02
    I:CG-TEXT  X: 3.03956E-03 P:  1.0 S: 1.59649E-02
    I:CG-WOOD  X: 1.86370E-02 P:  1.0 S: 1.59649E-02
    I:CG-CHEM  X: 1.28337E-02 P:  1.0 S: 1.24172E-02
    I:CG-PETR  X: 4.43972E-02 P:  1.0 S: 0.00000E+00
    I:CG-MACH  X: 1.86543E-02 P:  1.0 S: 1.59649E-02
    I:CG-OTHI  X: 5.70714E-02 P:  1.0 S: 1.59649E-02
    I:CG-SERV  X: 1.93762E-01 P:  1.0 S: 1.59649E-02
*

$PROD: YC-CRPS  t:0.0 s:1.0
    O:CG-CRPS  X: 1.00000E+00 P:        1.0
    I:PG-CRPS  X: 8.98649E-01 P:        1.0
    I:PM-CRPS  X: 1.01351E-01 P:        1.0
*

$PROD: YC-LIVE  t:0.0 s:1.0
    O:CG-LIVE  X: 1.00000E+00 P:        1.0
    I:PG-LIVE  X: 9.93484E-01 P:        1.0
    I:PM-LIVE  X: 6.51628E-03 P:        1.0
*

$PROD: YC-FISH  t:0.0 s:1.0
    O:CG-FISH  X: 1.00000E+00 P:        1.0
    I:PG-FISH  X: 9.79454E-01 P:        1.0
    I:PM-FISH  X: 2.05459E-02 P:        1.0
*

$PROD: YC-NATR  t:0.0 s:1.0
    O:CG-NATR  X: 1.00000E+00 P:        1.0
+A: IRS-STAX T: 7.60419E-03
    I:PG-NATR  X: 7.41743E-01 P:        1.0
    I:PM-NATR  X: 2.58257E-01 P:        1.0
*

$PROD: YC-AGPR  t:0.0 s:1.0
    O:CG-AGPR  X: 1.00000E+00 P:        1.0 T: 1.75227E-02
    I:PG-AGPR  X: 9.41459E-01 P:        1.0
    I:PM-AGPR  X: 5.85406E-02 P:        1.0
*

$PROD: YC-TEXT  t:0.0 s:1.0
    O:CG-TEXT  X: 1.00000E+00 P:        1.0
    I:PG-TEXT  X: 8.01851E-01 P:        1.0
    I:PM-TEXT  X: 1.98149E-01 P:        1.0
*

$PROD: YC-WOOD  t:0.0 s:1.0
    O:CG-WOOD  X: 1.00000E+00 P:        1.0
    I:PG-WOOD  X: 8.19113E-01 P:        1.0
    I:PM-WOOD  X: 1.80887E-01 P:        1.0
*
```

```
$PROD: YC-CHEM  t:0.0 s:1.0
    O:CG-CHEM  X: 1.00000E+00 P:        1.0
    I:PG-CHEM  X: 4.82700E-01 P:        1.0
    I:PM-CHEM  X: 5.17300E-01 P:        1.0
*

$PROD: YC-PETR  t:0.0 s:1.0
    O:CG-PETR  X: 1.00000E+00 P:        1.0 T: 4.76088E-02
    I:PG-PETR  X: 5.12603E-01 P:        1.0
    I:PM-PETR  X: 4.87397E-01 P:        1.0
*

$PROD: YC-MACH  t:0.0 s:1.0
    O:CG-MACH  X: 1.00000E+00 P:        1.0
    I:PG-MACH  X: 2.23487E-01 P:        1.0
    I:PM-MACH  X: 7.76513E-01 P:        1.0
*

$PROD: YC-OTHI  t:0.0 s:1.0
    O:CG-OTHI  X: 1.00000E+00 P:        1.0 T: 9.91851E-03
    I:PG-OTHI  X: 5.03213E-01 P:        1.0
    I:PM-OTHI  X: 4.96787E-01 P:        1.0
*

$PROD: YC-SERV  t:0.0 s:1.0
    O:CG-SERV  X: 1.00000E+00 P:        1.0 T: 1.98370E-02
    I:PG-SERV  X: 8.73161E-01 P:        1.0
    I:PM-SERV  X: 1.26839E-01 P:        1.0
*

$PROD: M-CRPS   s:0.0
    O:PM-CRPS  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 2.18663E-01
*+A:CUSTOM T: 1.48707E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-LIVE   s:0.0
    O:PM-LIVE  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 2.07532E-01
*+A:CUSTOM T: 1.63270E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-FISH   s:0.0
    O:PM-FISH  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 1.79813E-01
*+A:CUSTOM T: 1.25189E-01
+A:GOV-FXR T: 1.00000E+00
```

```
*

$PROD: M-NATR    s:0.0
    O:PM-NATR  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 9.06758E-02
*+A:CUSTOM T: 7.52735E-02
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-AGPR    s:0.0
    O:PM-AGPR  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 2.43187E-01
*+A:CUSTOM T: 1.63828E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-TEXT    s:0.0
    O:PM-TEXT  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 2.66288E-01
*+A:CUSTOM T: 1.71029E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-WOOD    s:0.0
    O:PM-WOOD  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 2.28776E-01
*+A:CUSTOM T: 1.53591E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-CHEM    s:0.0
    O:PM-CHEM  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 1.51404E-01
*+A:CUSTOM T: 1.03623E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-PETR    s:0.0
    O:PM-PETR  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 1.02481E-01
*+A:CUSTOM T: 7.09233E-02
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-MACH    s:0.0
    O:PM-MACH  X: 1.00000E+00
```

```
    I:FOREX     X: 1.00000E+00
+A:CUSTOMS T: 1.79680E-01
*+A:CUSTOM T: 1.14771E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-OTHI   s:0.0
    O:PM-OTHI  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 1.53703E-01
*+A:CUSTOM T: 1.18393E-01
+A:GOV-FXR T: 1.00000E+00
*

$PROD: M-SERV   s:0.0
    O:PM-SERV  X: 1.00000E+00
    I:FOREX    X: 1.00000E+00
+A:CUSTOMS T: 0.00000E+00
*+A:CUSTOM T: 0.00000E+00
+A:GOV-FXR T: 1.00000E+00
*

$PROD: X-CRPS   s:0.0
    O:FOREX      X:  1.00000E+00  P: 1.0
    I:PX-CRPS    X:  1.00000E+00  P: 1.0
*

$PROD: X-LIVE   s:0.0
    O:FOREX      X:  1.00000E+00   P:  1.0
    I:PX-LIVE    X:  1.00000E+00   P:  1.0
*

$PROD: X-FISH   s:0.0
    O:FOREX      X:  1.00000E+00   P:  1.0
    I:PX-FISH    X:  1.00000E+00   P:  1.0
*

$PROD: X-NATR   s:0.0
    O:FOREX      X:  1.00000E+00   P:  1.0
    I:PX-NATR    X:  1.00000E+00   P:  1.0
*

$PROD: X-AGPR   s:0.0
    O:FOREX      X:  1.00000E+00   P:  1.0
    I:PX-AGPR    X:  1.00000E+00   P:  1.0
*

$PROD: X-TEXT   s:0.0
    O:FOREX      X:  1.00000E+00   P:  1.0
    I:PX-TEXT    X:  1.00000E+00   P:  1.0
*
```


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```
$PROD: X-WOOD    s:0.0
    O:FOREX       X:  1.00000E+00   P:  1.0
    I:PX-WOOD     X:  1.00000E+00   P:  1.0
*

$PROD: X-CHEM    s:0.0
    O:FOREX       X:  1.00000E+00   P:  1.0
    I:PX-CHEM     X:  1.00000E+00   P:  1.0
*

$PROD: X-PETR    s:0.0
    O:FOREX       X:  1.00000E+00   P:  1.0
    I:PX-PETR     X:  1.00000E+00   P:  1.0
*

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K: -1.37E+01   Z: FOREX
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Chapter IV

Political Economy Aspects of Devaluation

Chapter IV

POLITICAL ECONOMY ASPECTS OF DEVALUATION

The public-choice aspects of a devaluation may be treated in several ways, but the crucial aspect always has to do with the positive analysis of the effects of the policy measure on various economic sectors. In other words the most involved part of making a "political economy" analysis is that it is not invariant with respect to the specification of the positive model. For example even restricting attention to the positions likely to be adopted by labourers, capital-owners, and the government, (a treatment according to functional distribution) quite different predictions regarding relative strengths and weaknesses of forces are bound to result, depending on how "capital" or "labour", or "government" is specified.

1. Devaluation as a change in relative prices.

If we go by the standard Heckscher-Ohlin-Samuelson (HOS) model which treats both capital and labour as homogeneous factors mobile across sectors, devaluation may be interpreted as a change in the price of all tradables, both exportables and importables. If all goods are tradable, therefore, a devaluation has no effect in terms of changing relative prices. All prices and incomes in the economy would simply rise in the same proportions. From this

viewpoint, therefore, there is no sector of the economy whose relative incomes deteriorate as a result of devaluation, and as a consequence there would also be little basis for proceeding with a political-economy analysis based on devaluation's effects on functional income-distribution. (This conclusion may not hold in terms of devaluation's effect on aggregate demand, however, a matter treated in Section 2.)

Relative price-effects from devaluation under HOS-type models are typically conceivable only if the economy may be divided into tradables and nontradables. Then devaluation raises the relative prices of both tradables in the same proportion as against that of nontradables or, what is the same thing, it turns the terms of trade against the latter. Then, as long as these relative price effects prevail, production shifts towards the production of tradables and away from nontradables, while the pattern of consumption moves in the opposite direction towards the relatively cheaper nontradables.

As long as both capital and labour are modelled as being mobile across sectors, however, the adverse terms of trade effect against nontradables cannot be permanent. In the final position, the old relative prices (and therefore also relative incomes) are restored. The Stolper-Samuelson relation keeps the relative prices of capital and labour

unchanged following a devaluation, since relative factor prices are sufficiently determined by the (unchanged) output-price ratio between the two tradables, although there will have been an increase in their nominal levels. This level of analysis therefore precludes any potential conflict between mobile and homogeneous factors, which remain fully employed and receiving the same real and relative incomes.[1] Ultimately, if nothing else happens, the prices of nontradables would rise by the full extent of the devaluation as well as the higher nominal factor prices push up the prices of nontradables.[2]

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[1]The HOS factor-market clearing conditions may be written as:

$$a_{i1}(w)x_1 + a_{i2}(w)x_2 + a_{in}(w)x_n = v_i \qquad \text{for } i = 1,2$$

where a_{ij} is the unit requirement of factor v_i in industry j ($j = 1,2,n$); w is the wage vector, and x_j is output of j. Note that since relative tradables prices do not change, neither do wages nor the a_{ij}. On the other hand, if x_1 and x_2 expand, the factor-market conditions imply that x_n must decrease. However, since w has not changed and factors continue to be fully employed, there is no change in functional distribution.

[2]It can be shown (e.g. Woodland 1982:236-7) that the general expression for the change in the price of nontradables may be reduced solely to a function of the relative change in the prices of tradables. E.g. let $H=[h_{ij}]$ be the matrix of unit cost- shares for tradables, where h_{ij} is the amount of factor i used per unit of j. On the other hand let $H_n = (h_{in})$ be the matrix of input shares for the nontradable. Then if p_t and p_n are the percentage changes in the prices of tradables and nontradables, respectively, then we have $p_n = H_n H^{-1} p_t$. For the case of two tradables and one nontraded good, this reduces to $p_n = [(p_2-p_1)(h_{2n}-h_{21})/(h_{22} - h_{21})] + p_1$. For a devaluation, the expression in square brackets vanishes, since $p_2 = p_1 = d$, where d is the magnitude of the devaluation. Hence $p_n = p_1 = d$ as well.

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If we adopt the Swan-Corden explanation, moreover, even if a temporary trade surplus were to appear as a result of a pure shift in the terms of trade amounting to an excess supply oftradables and an excess demand for nontradables, this is temporary, since then the price of nontradables would be bid up until the old relative price and wage-ratios are restored. At most the conclusion one could draw would be that devaluation may affect the interests of the nontradables sector in the short-run, but not ultimately. However there are no distinct losers or gainers in the sense of functional distribution, unlike the case of a tariff change, since the relative price between tradables is preserved.

The lesson to be drawn from this is not that devaluation has in fact no effects on relative prices and incomes, but rather that the conditions imposed by the model may not hold in reality. One possibility is that prices in the nontradables sector may be held fixed by the government for one reason or another. Then the pressure for higher factor prices could mean a squeeze on those factors employed in the nontraded goods sector, where final prices remain unchanged. If one continues to suppose factors are sectorally mobile, however, then this should imply a movement away from nontradables and a shrinkage of the latter.

Another possibility is that the presumed symmetry of a devaluation's effect across all tradables may fail to hold. Suppose for instance the importables sector was governed by imperfect competition, while the exportables sector (perhaps owing to the larger market) was perfectly competitive. Then a devaluation would not necessarily imply an equiproportional change in the prices of the two. Exportables prices would rise by the full amount of the devaluation, but those of importables may not if firms are equating marginal revenue to marginal costs. [3] Then a case may arise where a devaluation provides only redundant protection to importables and may entail a loss relative to exportables.

It is to be expected that intersectoral conflicts sharpen once one abandons the assumption that factors are homogeneous or, what is closely related to it, that they may move freely across sectors. In particular the specific-factors (SF) model would divide factors differently. Capital-owners may be categorised according to whether they are involved in import-substituting, exportable, or nontradable sectors, with the presumption that, because of mobility barriers, these are unable to shift easily from one sector to another. On the other hand, labour may freely move across sectors.

[3] In contrast, HOS-type models assume perfect competition.

We continue to view devaluation in terms of an increase in the price of tradables vis-a-vis nontradables. In the context of specific factors, this implies an increase in the labour-intensity of tradables, as these bid labour away from the home goods sector (using them with their respective fixed factors). In turn the home-goods sector becomes more capital-intensive. Wages rise everywhere, but by an amount less than the devaluation. Since for the moment nontradables prices remain fixed, while tradables prices rise by the devaluation, the benefits from higher wages are reduced accordingly as the share of tradables in workers' consumption is larger. On the other hand, rents to the fixed factors rise in both tradables sector, while they fall in nontradables. What is definite here is that specific or fixed factors in nontradables stand to lose from a devaluation.

It is a further step to regard labour also as being "specific" to the industry and therefore not mobile. (This tends to be truer, of course, the shorter is the period being considered.) For example, it is sometimes loosely suggested that labour in the import-substituting industries is also specific to those activities and has a vested interest in them. In the extreme, when both labour and capital employed are specific to the industry, one obtains results equivalent to the simple one-factor Ricardian model; in that case, it makes less sense to speak of interests of

"factors" in a functional-distribution sense, and the layman's argument about the interests of varying "industries" -- inclusive of all factors employed in them -- is given theoretical support.

A final complexity has to do with the nature and role of the state, which should also help clarify the interests and stake of the government in a policy-measure such as devaluation. Is the state autonomous of the rest of society? If so, what is its distinct objective? If not, what is the nature of its relations with the various sectors? How and to what extent are the interests of various groups represented within the government and reflected in its actions?

2. Devaluation and the aggregate price-level.

The other aspect of devaluation is that it raises the aggregate price level by raising the prices of tradeable goods. It should be noted this effect holds whether the action leads to a real devaluation or not. The effect of devaluation on the price level is the bridge which allows it potentially to affect wealth, expenditure, and employment (where all the above models assumed full employment). By reducing real wealth, devaluation reduces and hence real output and employment. On the other hand, in the medium to long term, a devaluation (to the extent it is real and not nullified by the loss in competitiveness brought by the

price change) might also expand output by stimulating exports.

The potential effects on this in a political-economy setting differ somewhat from the previous. To the extent the effect of devaluation reduces aggregate economic activity, it might be opposed by both workers and capital-owners alike; this result would not be derived from the "relative price" interpretation of the effects of devaluation, although perhaps export-earners would be less averse to its impact, being less dependent on the domestic market.

In particular it would be more likely to meet opposition from those whose incomes tend to adjust more slowly (e.g. urban fixed income-earners, including government employees), and by holders of debt in domestic currency. (This tendency is strengthened if, as is being done now, a high interest rate regime coincides with currency overvaluation: then debt holders have everything to lose from a currency-devaluation, which lowers the real value of the stock of existing debt and allows interest rates also to be lowered.)

The government, as a net domestic borrower, should by rights be in favour of a devaluation, going by the above argument. In addition to the "inflation tax" effect of a devaluation in reducing the value of domestic debt, the

resulting inflation also has the effect of increasing tax revenues at least nominally, since it pushes people into higher income brackets. It also raises the peso take for given tax rates, e.g. tariffs; but whether this is an improvement or not from the government's viewpoint as an institution, depends on the composition of government expenditures. In the extreme when all government expenditure is on nontradables, the government's real budget deficit would improve unambiguously. On the other hand, the government is also a net foreign debtor, and from this viewpoint, a devaluation tends to worsen the budget deficit as debt-servicing requirements increase.

Again the nature of the state and the interests it comes to represent must be more closely specified. A conceptual framework in which the government's main goal was simply to solve a problem bureaucratically (e.g. narrow a budget deficit) may be too simple, although it could also have some predictive powers. On the other hand, if one were to rely entirely on a class-interest view of the matter, the imperatives imposed by a bureaucratic mandate (e.g. charters) would be lost. A disaggregation of "government" along lines of a bureaucratic as well as class-interest theory should also be attempted to explain, say, cabinet disagreements over policy, varying views advanced by the Central Bank or the legislature.

3. The Philippine experience.

We utilise the foregoing discussion in seeking to analyse the previous and present configuration of forces aligned on the issue of devaluation. Our concern here is to show why the constituency behind a devaluation -- as well as other "structural reforms" included in official policy and rhetoric -- has in practice been rather weak. First we confine our attention to the relative-price effects of devaluation.

3.1 The potential pro- and anti-devaluation constituency.

From the previous discussion, it was seen that those who stand to gain from a devaluation are the exportables and importables sectors. This is usually thought to include, at least potentially, agriculture, food-processing, the intermediate input sector, and most of manufacturing.

Some policy makers may find it paradoxical that agriculture should typically be expected to benefit from a devaluation, yet there is no evident vocal constituency for devaluation to be found in agriculture. This is true for several reasons. The numerical exercises with the CGE-model in the previous chapter in fact suggest that most of the production gains accrue to the non-agricultural sector. This result should be interpreted more as a medium term development, however, since it becomes relevant only when

the labour-surplus has been absorbed and agriculture and non-agriculture compete for the variable factors.

Hence, is it the case that in the short run one can find a priori reasons for the agricultural sector to support a devaluation? Unfortunately not either. We may divide agriculture into tradables and nontradables. The analysis above tells us that a devaluation implies a lower price for nontradables, with a corresponding reduction in the income of fixed factors in that sector. Therefore to the extent agriculture is dominated by nontradables, it should be expected to resist a devaluation.

This is close to the prevailing situation in the country. Employment in the rice and corn sectors dominate agriculture, accounting for 73.5 percent of total workers employed in agriculture in 1987. (See Table 1 below.)

The present policy of output-price ceilings in favour of consumers effectively turns rice and corn into nontradables. On the other hand, rice and corn farmers make use of substantial imported inputs (fertilisers, herbicides, etc.). This makes the large -- and politically sophisticated -- rice and corn constituency averse to a current devaluation. A devaluation would raise input costs without a corresponding increase in output prices, since the latter are effectively controlled to benefit the urban population.

TABLE 1

PERCENTAGE DISTRIBUTION OF FARM WORKERS BY USUAL OCCUPATION*
BY REGION, PHILIPPINES, 1987

Particulars	Palay	Corn	Coconut	Sugarcane	Other Crops	Livestock	Poultry	Fishing	Off-Farm
Philippines	57.17	16.34	11.10	0.83	4.61	0.63	0.36	3.38	5.58
Ilocos	81.42	3.84	0.22	0.06	4.23	0.07	0.06	1.02	9.03
Cagayan Valley	74.25	19.37	0.78	0.66	1.37	0.21	0.04	0.27	3.15
Central Luzon	83.42	1.34	1.04	1.01	3.20	0.47	0.50	1.24	7.78
Southern Tagalog	49.95	8.50	14.53	4.50	6.93	3.18	0.98	7.19	4.24
Bicol	58.03	12.73	19.42	0.10	3.31	0.17	-	1.90	4.34
Western Visayas	80.59	4.72	2.17	0.63	2.50	0.02	0.02	3.19	6.16
Central Visayas	24.63	47.75	9.28	0.40	3.90	0.51	0.26	10.90	2.37
Eastern Visayas	47.47	5.37	29.40	0.48	10.87	0.89	0.34	3.13	2.25
Western Mindanao	29.76	26.69	30.90	-	4.57	1.61	0.46	2.60	3.41
Northern Mindanao	36.48	38.14	15.81	0.91	5.35	0.26	1.65	5.19	6.01
Southern Mindanao	33.80	24.06	22.63	0.65	8.96	0.32	0.34	1.13	8.31
Central Mindanao	48.00	35.44	8.24	0.26	0.97	0.43	-	0.40	6.26

*The term "usual occupation" refers to the enterprise or activity with which the working farm household members identify or associate themselves.

Source: Agricultural Accounts and Statistical Indicators Division, Bureau of Agricultural Statistics.

One might question whether farm labour may not also benefit from the predicted rise in wages in the medium term. To the extent that labour in agriculture is peasant labour, it may be more appropriate to classify it as a fixed factor rather than a mobile one and, to that extent, its income declines rather than increases with a devaluation.

Another obvious example of nontradables is the transport sector, with the added feature that it makes use of an imported input not produced domestically (i.e. petroleum). The analysis is similar to that of peasant agriculture: the higher price of the imported input raises costs and reduces demand, while output-price is fixed (e.g. think of fare regulation). In a fixed-factor situation, the income of the fixed-factor contracts. Experience has shown the transport sector to be among the most consistent and important oppositors of price-shocks, including those induced by devaluation. (See Table 2.)

Two other potentially strong supporters for devaluation are the intermediate input sector (which competes with imported input suppliers) and the export sector. The uncompleted trade liberalization in the Philippines has kept effective tariff rates of some intermediate inputs high. Even the recently enacted Executive Order 470, which intends to narrow and lower the tariff structure, suspend the reduction of rates on capital goods for two years, partly

TABLE 2

NUMBER AND PERCENT DISTRIBUTION OF ACTUAL STRIKES/LOCKOUTS DECLARED BY MAJOR INDUSTRY GROUP, PHILIPPINES: 1975-88

Major Industry Group	1975				1976				1977				1978			
	Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
ALL INDUSTRIES	5	100.0	1,760	100.0	86	100.0	70,929	100.0	30	100.0	30,183	100.0	47	100.0	33,721	100.0
Agriculture, fishery and forestry	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Mining and quarrying	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Manufacturing	5	100.0	1,760	100.0	70	81.4	59,099	83.3	26	86.7	28,572	94.7	40	85.1	31,824	94.3
Electricity, gas and water	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Construction	0	0.0	0	0.0	1	1.2	8,000	11.3	4	13.3	1,611	5.3	0	0.0	0	0.0
Wholesale and retail trade	0	0.0	0	0.0	9	10.5	1,700	2.4	0	0.0	0	0.0	4	8.5	1,007	3.0
Transportation, storage and communication	0	0.0	0	0.0	5	5.8	2,060	2.9	0	0.0	0	0.0	1	2.1	100	0.3
Financing insurance, real estate and business services	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0	0	0.0
Community, social and personal services	0	0.0	0	0.0	1	1.2	50	0.1	0	0.0	0	0.0	2	4.3	800	2.4

Major Industry Group	1979				1980				1981				1982			
	Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
ALL INDUSTRIES	39	100.0	16,728	100.0	62	100.0	20,902	100.0	260	100.0	98,585	100.0	158	100.0	53,624	100.0
Agriculture, fishery and forestry	0	0.0	0	0.0	13	21.0	2,952	14.1	23	8.8	5,480	5.6				
Mining and quarrying	0	0.0	0	0.0	0	0.0	0	0.0	6	2.3	8,130	8.2	17	10.8	2,300	4.3
Manufacturing	26	66.7	12,858	76.9	38	61.3	13,395	64.1	175	67.3	70,256	71.3	2	1.3	630	1.2
Electricity, gas and water	0	0.0	0	0.0	0	0.0	0	0.0	1	0.4	17	0.0	106	68.4	47,084	87.5
Construction	0	0.0	0	0.0	0	0.0	0	0.0	3	1.2	3,179	3.2	0	0.0	0	0.0
Wholesale and retail trade	7	17.9	1,470	8.8	0	0.0	0	0.0	12	4.6	3,958	4.0	3	1.9	563	1.0
Transportation, storage and communication	5	12.8	2,180	13.0	2	3.2	3,032	14.5	12	4.6	2,378	2.4	7	4.4	592	1.1
Financing insurance, real estate and business services	1	2.6	220	1.3	2	3.2	172	0.8	4	1.5	2,075	2.1	6	3.8	662	1.2
Community, social and personal services	0	0.0	0	0.0	7	11.3	1,351	6.5	24	9.2	3,112	3.2	4	2.5	953	1.8
													11	7.0	1,040	1.9

Note: Data for 1975-1979 excludes reports from MOLE Regional Offices.

Source: Yearbook of Labor Statistics, 1984, 1988

(Cont'd) NUMBER AND PERCENT DISTRIBUTION OF ACTUAL STRIKES/LOCKOUTS DECLARED BY MAJOR INDUSTRY GROUP, PHILIPPINES: 1975-88

Major Industry Group	1983				1984				1985			
	Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
ALL INDUSTRIES	155	100.0	24,697	100.0	259	100.0	65,306	100.0	371	100.0	111,265	100.0
Agriculture, fishery and forestry	17	11.0	1,812	7.3	20	7.7	5,466	8.4	16	4.3	2,390	2.1
Mining and quarrying	2	1.3	148	0.6	2	0.8	1,235	1.9	2	0.5	2,600	2.3
Manufacturing	94	60.6	19,143	77.5	182	70.3	47,619	72.9	260	70.1	86,658	77.9
Electricity, gas and water	0	0.0	0	0.0	1	0.4	100	0.2	2	0.5	212	0.2
Construction	4	2.6	139	0.6	4	1.5	453	0.7	1	0.3	1,152	1.0
Wholesale and retail trade	2	1.3	63	0.3	15	5.8	1,110	1.7	13	3.5	2,956	2.7
Transportation, storage and communication	10	6.5	993	4.0	24	9.3	3,639	5.6	28	7.5	7,744	7.0
Financing insurance, real estate and business services	1	0.6	35	0.1	9	3.5	2,520	3.9	7	1.9	2,461	2.2
Community, social and personal services	25	16.1	2,364	9.6	2	0.8	3,164	4.8	42	11.3	5,092	4.6

Major Industry Group	1986				1987				1988			
	Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved		Actual Strikes/Lockouts Declared		Workers Involved	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent	Number	Percent
ALL INDUSTRIES	581	100.0	169,479	100.0	436	100.0	89,574	100.0	267	100.0	75,848	100.0
Agriculture, fishery and forestry	20	3.4	5,241	3.1	23	5.3	7,086	7.9	14	5.2	3,536	4.7
Mining and quarrying	9	1.5	7,030	4.1	5	1.1	636	0.7	2	0.7	1,470	1.9
Manufacturing	366	63.0	87,669	51.8	232	53.2	52,690	59.0	131	49.1	42,351	55.8
Electricity, gas and water	5	0.9	160	0.1	12	2.8	1,773	2.0	15	5.6	2,259	3.0
Construction	6	1.0	419	0.2	2	0.5	1,200	1.3	3	1.1	172	0.2
Wholesale and retail trade	53	9.1	7,230	4.3	43	9.9	4,077	4.6	24	9.0	4,351	5.7
Transportation, storage and communication	52	9.0	32,091	18.9	31	7.1	11,467	12.8	22	8.2	9,620	12.7
Financing insurance, real estate and business services	11	1.9	1,168	0.7	12	2.8	1,541	1.7	12	4.5	3,507	4.6
Community, social and personal services	59	10.2	28,271	16.7	73	16.7	8,884	9.9	44	16.5	8,579	11.3

Note: Data for 1975-1979 excludes reports from MOLE Regional Offices.

Source: Yearbook of Labor Statistics, 1984, 1985

owing to the government's budget constraints. This provides a degree of protection for the intermediate input producers (although the problem of smuggling is more easily addressed through a devaluation rather than tariff protection). As a result, this sector has little incentive to call for devaluation.

The same factor accounts to some extent for the moderation of the export sector's call for currency depreciation. Throughout the Marcos regime, the development of the nontraditional export sector was accomplished mainly by exempting this sector from the operation of the generally protective tariff system through the system of duty-drawbacks, bonded warehouses, and export-processing zones. This had as a consequence that the nontraditional exports had weak linkages with the domestic economy, as shown by the small share of domestic value added relative to imported inputs (prime examples being garments and semiconductors). In these circumstances, while a devaluation raised the domestic price of output, it would also increase the cost of both imported inputs and, more important, put pressure on wages. Under certain conditions, the costs of renegotiating wage-contracts (e.g. work stoppages) may outweigh the favourable effects of devaluation on the price-cost relation in the exportables sector. This may be one reason the exportables sector is a less than enthusiastic supporter of aggressive exchange-rate policies.

A deeper reason for the absence of a vocal constituency for devaluation among exporters is the existence of interlocking directorates among important import-substituting and exportables industries. Domestic investors in the export sector typically have investments in other import-dependent industries as well, through interlocking directorates and conglomerate expansion. This makes their stand on devaluation ambivalent at best.[4]

In more recent years, however, the exportables subsector in manufacturing has gained more prominence, as it has come to attract larger and more established firms which have slowly diversified into some export lines. Groups such as the Philippine Exporters' Foundation are more conscious of the long-term interests of exporters.

On the other hand, the large firms in the import-substituting sector in manufacturing has generally tended to disfavour currency depreciation, although their principal nemeses are import-liberalisation and tariff reduction[5]. The reason is that, quite opposite to a devaluation, the last

[4]In the same manner it has been pointed out that the import-substituting industrialisation of the 1950s-60s was also joined in by the many members of the agricultural landowning interests.

[5]Influential lobbies have been formed specifically to oppose the proposed tariff reductions under EO 413 (now EO 470), e.g. the Confederation of Philippine Manufacturers, which itself is a subset of the Buy-Philippine-Made-Movement.

two measures impose a reduction of domestic prices charged. In a situation where domestic firms possess monopoly power, a good part of the increase in costs associated with a devaluation may be passed on to consumers. Simple theory would predict that the importables sector ought to benefit from a devaluation. How is one to reconcile this with this sector's general opposition to devaluation? A principal factor would have to be the high share of imported inputs in importables production which would cut into profits. The oligopolistic structure of some domestic markets may be another explanation. Depending on the degree of domestic competition, higher costs across may or may not be difficult to pass on without losing market share to competitors.

In the government itself, the lobby for a strong currency is predominant. There are at least two ways to interpret this. One is to connect state policy with class interests. Then one would have to say (and show) that government policies are dominated by those sectors and classes discussed above which generally disfavour a weakening of the currency. At certain times and for some purposes, this way of looking at things does possess some explanatory power.

A middle-brow explanation, which need not however supplant but may supplement the former, is look at the bureaucratic interests of the state or its organs.

The main actors in the setting of and debate around the exchange rate have been the Central Bank and departments associated with particular constituencies, such as the Agriculture, Finance, Trade and Industry, and to a lesser degree the NEDA. Historically the Central Bank has been an important and direct intervenor for a strong currency, a function justified by its perceived mandate to preserve price stability.

In general, especially in the last few years, a strong-currency policy has been pursued, using tight monetary and fiscal policies. From the viewpoint of purely bureaucratic interest, a weak-currency policy has an adverse impact on the government because of the large debt overhang. The share of foreign to total debt for the national government has been declining slowly but remains large at 41 percent (Table 3). A devaluation automatically increases the expenditures necessary to service foreign debt. The same is true for the Central Bank, whose foreign liabilities amounted to $5.5 billion in 1990. In addition, the counterpart funding required for foreign-assisted projects -- especially infrastructure -- also varies directly with the exchange rate. Given the nominal ceilings imposed on the total public-sector deficit, a currency depreciation actually lowers the government's scope for maneouvre. It is therefore to be expected that a currency depreciation should find few adherents within the bureaucracy.

TABLE 3

TOTAL FOREIGN EXCHANGE LIABILITIES, BY TYPE OF BORROWER
(In Million US Dollars)

Particulars	1972	1984	1985	1986	1987	1988	1989	1990[a]
Public Sector	1,477	17,548	19,122	21,829	22,751	22,668	22,222	23,458
Government Banks	776	1,034	841	873	463	393	492	644
Central Bank	-	4,113	5,923	7,161	6,504	6,164	5,429	5,530
Public Institutions	701	12,151	12,358	13,633	15,784	16,111	16,301	17,284
Red Clause	-	190	-	162	-	-	-	-
Private Sector	1,255	7,870	7,130	6,427	5,898	5,247	5,394	5,484
Commercial Banks	-	3,026	2,112	1,871	1,906	1,857	1,942	1,694
Private Institutions	1,255	4,800	4,776	4,172	3,631	3,140	3,013	3,239
Red Clause	-	47	242	384	161	250	439	548
T O T A L	2,732	25,418	26,252	28,256[b]	28,649	27,915	27,616	28,942

[a] As of November 1990.
[b] Excludes standbys and guarantees.

Sources: Department of Budget and Management
Department of Finance
Central Bank

3.2 Macroeconomic Aspects.

The macroeconomic aspects of the problem are no less important. As was seen above, they are an important explanation for intra-government resistance to a large depreciation. Quite apart from this, we observe that the short-run stagflationary effect of devaluation has also become quite severe, particularly in the late eighties -- a period of high oil prices, a high level of dependence on imported inputs, and a large foreign debt. For most, the memory of the consecutive devaluations of 1983 and 1984 has made devaluation synonymous with economic crisis and collapse. On a smaller scale the same is true for the "floating rate" de-facto devaluation in 1971, which caused an economic slowdown, double-digit inflation (even before the oil shocks of 1973-74), and political unrest. But the experience of the 1970s was followed by a boom in commodity prices and foreign capital inflows from the mid-70s which allowed the country to pursue a high-growth path. In contrast, the experience of the mid-eighties included an economic collapse which continued well into the first half of 1986. The devaluation in 1990 (due to the higher oil prices caused by the Gulf crisis) was once more perceived as a signal for the slowdown in 1990 and 1991.

All these contrast sharply with the devaluation in 1962, which did not cause severe economic dislocation. This

was a period of relatively low import prices (pre-OPEC oil prices, especially) and a lower dependence on imported inputs. Devaluation actually increased agricultural exports and eased the balance of payments crisis; it did not lead to a significant slowdown in the pace of growth, nor to double-digit inflation.

From the foregoing, it is evident that the short-run pains of devaluation have become stronger than before, partially explaining the stronger resistance to it, compared with before. The espousal of devaluation among political leaders and opinion-makers -- except for those in academe -- has tended to become rarer, exposing one to the charge of deliberately espousing stagflation.

Most devaluations have historically been accompanied by fiscal and monetary austerity, owing to the standard fear of inflation. This aggravates the expected economic slowdown and conflicts with the need to provide "safety nets" to fixed-income earners and other groups adversely affected. On the other hand, the ability to provide such safety nets since the 1980s has been practically nil, owing to the severe constraints imposed on deficit spending. Public knowledge of this inability increases public resolve to resist substantial currency depreciation.

A large part of devaluation's association with crisis and collapse is itself the result of the government's conscious policy of defending a nominal level of the exchange rate until there is massive hemorrhaging in the balance of payments. Large devaluations have typically occurred during times of economic slowdown or recession abroad.

This implies there is no palpable "kick" in exports to be expected, since the positive effect on competitiveness is typically wiped out by the depression in demand.

Chapter V

Concluding Remarks

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Critique of Past Policy

The exchange rate policy, aside from being an integral part of the industrial and trade program, is of course not independent from major macro policies, particularly monetary and fiscal policies.

As previously stated, significant exchange rate adjustments in the Philippines are done only during times of extreme balance of payment difficulties and depletion of international reserves. Thus exchange rate adjustments are not utilized to promote exports nor encourage efficiency and competitiveness but simply to stave off capital outflow and reserves depletion during times of crisis. The result we believe has been detrimental to the medium and long term growth of industries by constricting export potentials and reinforcing the final assembly and packaging aspects of Philippine industrialization to the detriment of backward integration and the development of a dynamic intermediate sector. Import dependence and trade deficits therefore continue unabated.

Furthermore, the hard struggle to keep the peso from depreciating during times of BOP deficits (when things have

not yet reached crisis proportions) have aggravated the unfortunate moves towards recessionary policies to reduce aggregate demand in order to close the trade gap. High interest rate policies and credit contractions, which have been the prescriptions for inflation and trade imbalance, are exacerbated by attempts to prop up the peso making the monetary restrictions even more severe. Growth rates have therefore been needlessly pulled down.

Competitiveness of Philippine exports have been weakened not only by an overvalued currency but by high interest costs that increase the value of exports.

Of course an isolated devaluation of the currency without corresponding fiscal, monetary and trade policy changes will reduce whatever benefits can be derived from the move, or even cause negative net effects. We have already pointed to the contractionary effects of a devaluation which increases the costs of imported inputs and imported capital goods. Furthermore, prices are sure to rise as a result of the devaluation. Depending on people's expectations and government policies, this may trigger an inflationary process. These short-run negative effects may, together with wrong policies, lead to an economic downturn brought about by a supply shock which may offset whatever benefits a devaluation can bring. (An extreme example of course is the series of devaluations in the second half of

1983 and early 1984 which were the harbingers of the 1984-1985 economic collapse). The timing of the exchange rate adjustment as well as proper accompanying policies become vital to any prescription.

The problem arises because the stagflation effects of a devaluation occur immediately and usually with full force. The benefits on exports, however, are lagged and the positive effects on industrial competitiveness and efficiency occurs only in the medium and long-term. It is therefore important that the short- run negative effects of devaluation be mitigated and cushioned so that they will not jeopardize the longer run positive effects. An important consideration here is the fact that most people's perception of a devaluation is negative and these negative expectations may indeed generate real results. Thus a substantial devaluation will have to be accompanied by counter policies to cushion the negative expectations.

Timing

As stated earlier, the ineffectiveness of the exchange rate adjustments in the eighties have been mainly due to the fact that devaluations have been made in extreme balance of payment difficulties and accompanied by severely restrictive and contractionary measures which lead to supply shocks and drastic cuts in output and incomes. The supply shock

affects the export sector as well, and so the positive demand side benefits of devaluation are drowned out by the supply-side contraction.

In contrast to this, the devaluation experiences of the Philippines have been much better in the sixties (the 1962 devaluation) and the seventies (the 1970 floating rate adjustment) wherein output growth did not turn negative, exports grew satisfactorily and trade deficits were reduced as well.

The important differences are:

1. a more conducive international trade environment
2. less restrictive and contractionary accompanying policies
3. no debt overhang

All of the above are of course related. The role of the net resource outflow due to the foreign debt payments is very important since it has left very little room for maneuverability in the external account and macro variables of the country. In the past extreme balance of payment difficulties may be more easily solved by a one-shot devaluation. The expenditure switching role of devaluation is relevant and important in the move towards trade balance. In the eighties, however, the debt hemorrhage, together with extreme monetarist prescriptions, have used exchange rate adjustments as part and parcel of a draconian policy to

create a recession, reduce aggregate demand in order to achieve trade balance. This entails a fall in import demand via a fall in production and incomes.

To effect a beneficial effect from devaluation, past lessons have told us that devaluation must be done in a situation wherein the balance of payment deficit is not so large as to entail an economic collapse, "animal spirits" are still adequate and accompanying policies are not overly restrictive and contractionary. In other words, one must devalue before extreme crisis and difficulties have set in. Furthermore, a conducive trade environment will help in getting a significant and quick export response that will stave off the automatic contractionary tendencies of a devaluation. On hindsight, a devaluation during late 1988 or early 1989 might have been advantageous. First of all, this occurred before the economic recession in the United States and other Western countries so that the world market and terms of trade were more in our favor. Second, we were already experiencing balance of payments difficulties which would justify a devaluation, but the deficits and reserves reduction were not yet in gargantuan proportions as to have caused an economic collapse. Third, the inflation rate was still in single digits and quite manageable. The second and third points would have allowed a not too restrictive and contractionary macro policy to accompany the devaluation.

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The fact that people's expectations associate devaluation with economic crisis necessitates that the devaluation be made in more optimistic and expansionary times. These are usually times when balance of payments are starting to be in deficits.

It would also be difficult to justify a devaluation during times of slow growth and increasing international reserves (as in 1991). First the lack of confidence in the system my heighten the negative short-run stagflation effects of a devaluation. Secondly, the political will for a devaluation will most likely be wanting simply because international reserves are high and there are no market pressures for a devaluation. In the future, we foresee that sometime in 1992, when the economy will have hopefully regained its steam and when trade deficits again start to rise, a devaluation must be implemented before a BOP crisis starts to set in. It is important however, that inflation be reduced substantially between now and then so that the one-shot inflationary effect of devaluation will not be too debilitating.

A one-time sharp devaluation would be recommended on condition that the accompanying measures mentioned below will be undertaken. The devaluation should be large enough to narrow down the trade deficits significantly. The one-shot dose would be better than several phased depreciations

since the latter would cause more uncertainty and possible wavering on the Authorities as vested interest groups would lobby against the devaluation. After the devaluation, a managed float of the peso would be recommended wherein the peso will be allowed to float in the world market without Central Bank intervention as long as the exchange rate falls within reasonable bounds. If for example, the peso rate is adjusted to 34 pesos to one dollar (as is suggested in the CGE exercise), then the peso will be allowed to float freely within, say, 5% of its value - i.e. between 32.3 to 35.2 pesos per dollar.

Accompanying Measures

Due to the one-shot short-run stagflation effect of a devaluation, accompanying measures will have to ensure that negative expectations will not be translated into an inflationary and/or recessionary spiral:

1. Given that inflation is not too high (in the single digit or low teens), then monetary policy should not be too restrictive (so that recessionary tendencies can be avoided) but it should also not be too expansionary (so that inflationary tendencies will not be heightened). A money growth that is not far from (perhaps slightly lower than) the money growth right before the devaluation may be considered.

2. A significant foreign debt relief is necessary for exchange rate adjustments to be more effective:

a) As devaluations improve the trade deficits, it should be the case that the foreign exchange earned should immediately be used to finance economic growth and development. If the foreign exchange savings are mainly channeled to debt payments, people will not feel the beneficial effects of devaluation and their negative perception of it will simply be reinforced.

b) A significant relaxation of the fiscal constraint should be effected since safety nets should be provided for low income earners as discussed in the next number. The least painful way to relax the fiscal constraint is to obtain some debt relief.

c) A devaluation will increase the peso costs of foreign debt payments and will increase the budget deficit[1]. It will also increase the Central Bank deficits in peso terms (since the CB has around $5 billion worth of foreign debt). These effects

[1]There would also be a corresponding increase in revenue from trade taxes but this will most likely be smaller than the increase in peso payments for the foreign debt.

will have to be reduced. Thus a devaluation would really work better if it is accompanied by a significant debt relief.

3. To stave off negative impacts on low income groups, and to erase the negative impression of people on devaluations (this is an important point we will insist on), safety nets will have to be provided for in earnest, especially for fixed income earners. One way to partially offset the negative inflationary impact, is to make a counter move, say a decrease in oil tax[2], which will cushion the short-run stagflation effects. This should be done without unduly over expanding the budget deficit or reducing government expenditure and investment (the former will aggravate the inflationary tendency, the latter the recessionary tendency). Thus, a significant debt relief and (if inadequate) an increase in direct taxes and luxury consumption tax will be needed. In the main, due to 2c) and the provision of safety nets, one should allow some increase in the budget deficit to accompany the devaluation at least in the initial year.

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[2]The reduction in the oil tax, unlike the fuel price reduction in August 1991, should be progressive and affect diesel and kerosene prices more than that of premium gasoline.

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Overall, the accompanying measures, together with the devaluation move itself, will require a lot of political will and astuteness from the government. It is definitely not as easy as some people may think especially if devaluation is to be viewed as integral to a medium and long-term industrial and trade policy going beyond its usual role as bitter pill to stave off foreign exchange hemorrhages.

Annex

Measures of Overvaluation and Monitoring Mechanisms

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Only in theory can one speak of perfect flexibility or a truly fixed exchange rate. In practice, policy regimes can only approximate the market clearing exchange rate. It is for this reason that literature on exchange rate management and the measurement of the divergence of the exchange rate from its market clearing value is so diverse. This Chapter presents mangement alternatives and reviews selected measures that have been used by economists engaged in policy debates on exchange rate policy.

PART A. Exchange Rate Regimes - Major Categories

Developing countries faced a variety of options after the collapse of the Bretton Woods agreement in 1973. The options can be classified into three major groups - a pegged exchange rate regime, a dual exchange rate regime and a floating exchange rate regime.

The class of pegged exchange rate regimes by itself has a number of variations:

Independent adjustable peg regime - This is currently being used by Scandinavian countries and was for a time adopted by New Zealand and Australia. This variation makes periodic but not so frequent upward/downward adjustment to a single or basket of currencies.

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Crawling peg - More frequent adjustments are made based on either discretion or on the purchasing power parity (PPP). OECD countries used this. The former variety made use of the BOP or the current account as the basis for adjustment.

Independently pegged on an indefinite basis - If pegged to a single major currency, this regime comes closest to the fixed rate regime.

Snake arrangements - this is a collective arrangement with the purpose of stabilizing the bilateral exchange rates of participant countries. The European Monetary system (EMS) which started in 1979 is an example.

The second type of regime restricts exchange rate movements for commercial transactions but permits the rate to float for capital transactions. Versions of the floating regime have been in operation in various countries and the differences reflect the degrees of exchange rate management. These range from a pure float to vague exchange rate targets.

In practice, the choice of an exchange rate regime to a large extent depends on the characteristics of the country. These characteristic include factor mobility, openness, capital mobility, diversification of external sector and the magnitude of the divergence in inflation rates.

A choice of regimes based on these considerations can be very difficult because of the theoretical uncertainties when focussing on a set of characteristics.

For example, in the choice between a pegged regime and a float the policy maker may have to look into particular domestic characteristics and the international trade patterns of the country. if the country's trading partners have low stable inflation rates and if the country under consideration experience difficulties checking inflation, it might be proper to choose a pegged regime. On the other hand, the inflation rate differentials are by itself a good argument for flexible rates.

Going by the major groupings above, the Philippines belongs to the floating rate category. A majority of the developing countries also fall in this category. These are Bolivia, Ghana, Nigeria, Uganda, Uruguay and Lebanon to name a few. Within the floating rate classification are sub-classifications adopted by these countries.

There are basically two choices in a floating exchange rate arrangement - the interbank system and the auction market system. The choice seems to be governed by the existing structure and institutional settings prevailing at the time of adoption of the regime. In the former arrangement, commercial banks and foreign exchange dealers and in some cases, individuals and firms participate in the interbank market. Usually those countries which adopt this system already have an adequate number of banks and dealers to ensure competitiveness. A major advantage of this system

is that it does not require a large amount of manpower and proficiency to conduct auctions as in the other system. Together with this, policymakers choose interbank systems in the hope that free entry would encourage a rapid development of institutions favorable to the economy.

Several variations of this system are in operation and can be distinguished by the degree of regulation by the authorities. For example, maximum and minimum limits on foreign currency holdings can be imposed on market participants as in Uruguay and the Philippines. The purpose of regulations is either to prohibit participants from cornering markets and prevent overly large exposures of banks to exchange risks.

In an auction system, all or a majority of receipts from exports are surrendered to the CB at the current exchange rate. The amount to be auctioned on a regular basis is decided by the CB who sets the minimum price below which it will not accept offers. In this system, the CB plays a more dominant role in the market and can specify the amount and the manner by which foreign exchange resources would be utilized. They can in fact decide on the amount of sales based on a particular adjustment program being implemented.

As in other auction markets, bids are examined and the next highest bid that exhausts supply are accepted for as long as it does go below the preset minimum price. This marginal rate which is market clearing becomes the market rate. This rate applies to the next auction session.

The bidding process may take the form of a Dutch auction or the "marginal pricing" approach. In the former, each bidder pays for the price he actually quotes while in the latter a single price at which the supply is exhausted is chosen and is binding for all successful bidders.

As in interbank systems, regulations abound in an auction system with the same intentions given above. The main difference between the two systems is in the role of the CB in the market. The central role given to the CB in the auction system makes it a very powerful institution in allocating foreign reserves unlike in the interbank system where control of total reserves is diffused.

A variety of reasons can be offered for adopting a floating regime. A major reason for several countries is the BOP difficulties encountered with fixed rate regimes which makes the money supply almost endogenous. With scarce foreign exchange assets, the most viable option for crisis countries seems to be the floating rate. However the degree of floating exchange rate management can be a source of

trouble spots that will spoil an overall development objective.

The CB role in a floating regime as discussed above can be quite extensive to the extent that a seemingly managed float is in fact a fixed rate regime for as long as reserve flows can sustain an overvalued currency. Putting enough regulations and restrictions on foreign exchange transactions in both auction and interbank systems with the aim of imposing inflation discipline can encourage disintermediation and the proliferation of a parallel market.

One cannot readily divorce exchange rate policy from macroeconomic stabilization policies and the overall structural adjustment scheme. While achievement of a close to market clearing exchange rate can by itself be a catalyst for long-run structural reforms in the trade and financial sectors, a blend of prudent exchange rate, monetary and fiscal policies is essential to achieve short-run goals of price and exchange rate stability. This does not mean however that direct reforms through the trade and financial liberalization are unnecessary. The absence or presence of these reforms will of course determine the development path the economy takes.

PART B. Indicators Used in Exchange rate assessment

1. Introduction

There are various indicators that are used in the assessment of the appropriateness of the exchange rate: effective exchange rate (EER) indices, , relative price indices, parallel markets, elasticities, and commodity specific analysis (Johnson et al, 1985). Section 2 reviews the various indicators used in exchange rate assessment; section 3 focuses on effective exchange rate indices; section 4 presents suggested formula, data data description and sources, and some results; and, section 5 gives some concluding remarks.

2. Indicators Used in the Assessment of the Appropriateness of Exchange Rate

2.1. Effective Exchange Rate (EER) Indices

In a world of generalized floating, we observe simultaneous appreciation with respect to some curencies and depreciation with respect to others. Thus, we need an index or summary measure of how a currency performs, on average, in foreign exchange markets. This index is called the nominal effective exchange rate (NEER) (NEER) index. It is a weighted average of various bilateral exchange rates and measures the average change in the value of a country's currency against that of all other currencies.

A measure of competitiveness must take into account not only changes in exchange rates but changes in prices as well. Thus, we use real effective exchange rate (REER) indices which are NEER indices adjusted for relative changes in prices. REER measures the average change in country's exchange rate against that of all other currencies, adjusted for price developments. They are frequently used as an index of the competitiveness of a country's goods relative to those of other countries.

The advantage and appeal of effective exchange rate (EER) is that as a concept, unlike elasticities, it is relatively easy to interpret. If the exchange rate is defined as the foreign currency price of domestic currency, then an increase in REER over its level in a base period when the external position was considered adequate implies that external competitiveness has deteriorated. EER appreciation implies loss of international price competitiveness which could translate into deterioration of trade balance and BOP difficulties.

However, calculated REER values should not be used in any direct sense to measure the extent of over/under valuation. At best, they may provide some broad indications of the gain/loss in price competitiveness relative to the selected base period and, thus, only a rough measure of direction of change in international competitiveness.

2.2. Relative Price Indices

The ratio of price of traded good to price of nontraded good is an indicator of the internal terms of trade or the internal competitiveness of the traded goods sector, i.e., its ability to compete with nontraded goods for scarce factor of production.

2.3. Parallel Markets

The parallel market exchange rate is a rate that is essentially determined by market forces and reflects the opportunity cost of foreign exchange. The existence of parallel markets where transactions take place at floating exchange rates that are more depreciated than the official rate is evidence that the official rate is inappropriate. However, it may also be a reflection of how effective exchange and capital controls are. Nevertheless, it is an indicator that could be useful in exchange rate management.

2.4. Elasticities

Another indicator in exchange rate assessment is the sensitivity of economic variables to exchange rate changes. The procedure is to have an econometric estimation of a model, followed by simulation, to arrive at a recommendation on exchange rate, given a set of policies and objectives.

It has the advantage of not being limited to comparison with a particular base period and it lends itself to modelling of the way factors other than exchange rate affect BOP. But like indicators of competitiveness, it is based on historical experience and therefore needs to be qualified in the presence of structural changes.

2.5. Commodity-Specific Analysis: Domestic Resource Cost (DRC) Approach

This approach derives the domestic cost of producing exports and import substitutes per unit of foreign exchange earned or saved, after correcting for all price distortions and netting out taxes and subsidies. This provides for each commodity an implicit exchange rate, allowing a ranking of activities according to comparative advantage and an assessment of prevailing exchange rate.

3. Effective Exchange Rate Indices and Relative Price Indices As Indicators of Competitiveness

3.1. Formula for the Calculation of Effective Exchange Rate Indices and Relative Price Indices Used in Different Studies

3.1.1. Bautista (1980)

Bautista uses the following formula:

$$NEERX_B = \pi_i (r_i)^{wxi}$$

$$NEERM_B = \pi_i(r_i)^{wmi}$$

$$REERX_B = NEERX_B/[P/\pi_i(Px_i)^{wxi}] = [\pi_i(r_i Px_i)^{wxi}]/P$$

$$REERM_B = NEERM_B/[P/\pi_i(Pm_i)^{wmi}] = [\pi_i(r_i Pm_i)^{wmi}]/P$$

where: P = domestic price level which is proxied by WPI or CPI; r_i = index of exchange rate, in units of the home currency per unit of i's currency, relative to the base year level; $wx_i(wm_i)$ = export (import) weight for the ith partner country; $Px_i(Pm_i)$ = price of exports (imports) in country i in i's currency; and, i = 1 ... 12 developed countries: US, Canada, Japan, UK, France, West Germany, Netherlands, Belgium, Italy, Switzerland, Sweden, and Australia.

The first equation is an export-weighted index of prices of foreign currencies in terms of the home currency that would reflect the effect of exchange rate changes on the competitiveness of exports to domestic producers. It is used as an indicator of average profitability of exporting.

The second equation is an indicator of average profitability of domestic import substitution; it is an import-weighted index that would reflect the impact of exchange rate changes on the cost of imported goods in terms of the home currency.

The third and fourth equations are PPP-adjusted NEERs and are indicators of the real exchange rate.

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3.1.2. Rana (1981)

Rana uses the following indicators to examine the effects of exchange rate changes on balance of payments:

$$NEERM_R = \Sigma_i wm_i ri_i$$

$$REERM_R = \Sigma_i wm_i ri_i P/P_i$$

where: ri_i = index of exchange rate, in units of i's currency per unit of home's currency, relative to the base year level; P_i = domestic price level in country i in i's currency which is proxied by WPI_i or CPI_i; P = domestic price level in RP which is proxied by WPI or CPI; and, wm_i = import weights for the ith partner country.

3.1.3. Central Bank (1987)

CB uses the following formula:

$$NEER_{CB} = \Sigma_i wt_i ri_i$$

$$REER_{CB} = NEERCB/(\Sigma_i wt_i P_i/P)$$

where: ri_i = index of exchange rate, in units of i's currency per unit of home's currency, relative to the base year level; P_i = domestic price level in country i in i's currency; P = domestic price level in RP; wt_i = total trade weight for the ith partner/competitor country

3.1.4. Dohner et al (1988)

Dohner et al use the following indicators of relative prices as measures of real exchange rate:

$REERP_{DO} = \Sigma_i wpx_i WPI\$_i/WPI\$$

$REERC_{DO} = [\Sigma_i wcx_i CPI\$_i]/CPI\$$

$PtPnt_{DO} = \Sigma_j wva_j PGVA_j/\Sigma_k wva_k PGVA_k$

TT_{DO} = unit value of exports/ unit value of imports

$REALW_{DO}$ = Manufacturing wage/GDPDEF

where wpx_i = export weight for the ith major export market (i: US, Japan, West Germany, Netherlands and South Korea); wcx_i = export weight of the ith Asian competitor (i: South Korea, Indonesia, Malaysia, Thailand and Singapore); WPI$ (CPI$) = WPI (CPI) in dollars; WPI$i (CPI$i) = WPIi (CPIi) in dollars; PGVA = implicit price index of gross value

added; wva_j = GVA (traded) weight for the jth traded good sector (j: agriculture, fishery and forestry, mining and quarrying, and manufacturing); wvak = GVA (nontraded) weight for the kth nontraded good sector (k: construction, electricity and gas, and services); REERP (REERC) = REER relative to partner (competitor) countries; PtPnt = price of traded goods relative to nontraded goods; TT = terms of trade; and, REALW = real wage.

They also "compare" actual change in exchange rate with factors that tend to change equilibrium exchange rate.

They use the real wage as an indicator of domestic cost; however, the wage series for the Philippines are available only up to 1981.

3.1.5. Edwards (1988)

Edwards uses the following indicators of relative prices as measures of real exchange rate:

$(Pt/Pn)_E$ = EiPti/Pn = EiWPIi/CPI (bilateral)

= $\Sigma_i$wiEiPti/Pn = $\Sigma_i$wiEiWPIi/CPI (multilateral)

$(EiPi/P)_E$ = EiCPIi/CPI (bilateral)

= $\Sigma_i$wiEiCPIi/CPI (multilateral)

$(Pt/Pnt')_E$ = PMRiPti/Pn = PMRiWPIi/CPI (bilateral, parallel market rate)

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where Ei = exchange rate, pesos per foreign currency i; Pti = price of traded good in country i; Pn = price of nontraded good in RP; Pi = price level in country i; P = price level in RP; PMRi = parallel market exchange rate; CPIi (WPIi) = CPI (WPI) in country i; CPI (WPI) = CPI (WPI) in RP; wi = trade weight for country i; He uses official and black market rates, bilateral and multilateral rates.

3.1.6. Power and Dohner (1990)

Power and Dohner use the NEER and REER (as calculated by the IMF and published in IFS) to assess the appropriateness of exchange rate.

They also "compare" actual change in exchange rate with factors that tend to change equilibrium in exchange rate (such as recovery which led to increase import spending, increase in capital mports, and trade liberalization). Finally, they suggest that Thailand, Malaysia and Indonesia are the relevant regional competitor countries of RP and that the relevant REER should relate to productivity-adjusted wage rates.

3.1.7. Comparison

The EER used in the above studies differ in terms of the following six factors: (1) choice of partner/competitor countries; (2) choice of weights; (3) choice of price

indicator; (4) calculation of proportionate changes in exchange rate; specifically, Bautista defines an increase in exchange rate as depreciation whereas Rana and CB define it as a depreciation; (5) choice of the base period; and, (6) choice of mathematical formulation of the index; in particular, Bautista uses geometric averaging while the others - Rana, Dohner et al, and CB - use arithmetic averaging; also, Rana and Dohner et al combine the relative price and the exchange rate for each country and then combine the ratios using some weighting procedure while CB and Mansur compute an index of relative prices and an index of exchange rates using the same weighting procedure and then combine the two to get the index.

3.2. Update/Revalidation of Existing Estimates of Exchange Rate Indices and Relative Price Indices

3.2.1. Dohner et al (1988)

Table 1 shows the revalidation/update of the results of Dohner et al for PtPnt, TT, REERP, and REERC. Our results for TT and PtPnt are very close to those of Dohner et al. Also, our results for REERP and REERC have the same patterns as those of Dohner et al.

3.2.2. CB

Table 2 shows the revalidation/update of the results of CB for NEERP and REERP. We have chosen US, Japan, Germany, and UK as partner countries. Our results track those of the CB extremely well.

4. Suggested Indicators

4.1. Formula

4.1.1. Nominal and Real Exchange Indices (Bilateral)

As an indicator of competitiveness relative to major trading partners (Japan, Germany, and US) and competitors (Korea, Singapore, Malaysia, Indonesia, Thailand, HongKong and Taiwan), individually, we use the following:

Nominal exchange rate index: $ri_i = (Ei/Eio)100$

Real exchange rate index: $reri_i = (REi/REio)100$

where Ei = foreign currency i per unit of domestic currency; REi = (Ei/(Pi/P)), real exchange rate; and "o" denotes baseyear values.

4.1.2. Various EER Indices

We compute the indices using the arithmetic weighted average formulation

$$NEER = \Sigma_i w_i ri_i$$

$$REER = NEER/[\Sigma_i w_i P_i/P]$$

where rii = index of exchange rate, in units of i's currency per unit of home's currency, relative to the base year level; w_i = 1980 total trade (exports plus imports) weights; P_i = price level in country i, proxied by CPI_i, and P = price level in RP, proxied by CPI.

These indices are used as indicator of competitiveness relative to each of the following set of partner/competitor countries:

(1) 12 industrial trading partners: US, Canada, Japan, UK, France, West Germany, Netherlands, Belgium, Italy, Switzerland, Sweden, and Australia.

(2) 5 major trading partners: US, Japan, Germany, UK, Netherlands and Korea.

(3) 4 major trading partners with strong currencies: US, Japan, Germany, and UK.

(4) 3 trading partners with strong currencies: US, Japan, and Germany.

(5) 7 major Asian competitors: Korea, Singapore, Malaysia, Indonesia, Thailand, HongKong and Taiwan.

(6) 5 major Asian competitors: Korea, Singapore, Malaysia, Indonesia and Thailand.

(7) 4 major Asian competitors: Singapore, Malaysia, Indonesia and Thailand.

(8) 3 major Asian competitors: Malaysia, Indonesia and Thailand.

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4.1.3. Relative Price Indices

As an indicator of internal relative prices, we use the ratio of price of traded goods to price of nontraded goods:

$$PtPnt = (\Sigma_j wva_j PGVA_j / \Sigma_k wva_k PGVA_k)100$$

where wva_j = GVA (traded) weight for the jth (j = 1 ... 3) sector; wva_k = GVA (traded) weight for the kth (k = 4 ... 8) sector; and, PGVA = implicit price index of gross value added.

As an indicator of external relative prices or the terms of trade, we use the ratio of price of exports to price of imports:

$$TT = (UVE/UVI)100$$

where UVE = unit value of exports index and UVI = unit value of imports index.

4.1.4. Parallel Market Rate

To assess the appropriateness of the official exchange rate, we compare it with the parallel market exchange rate.

4.2. Data

The description and sources of data to be used in computing the formula presented in 4.1 are given below.

4.2.1. Annual data

(1) EIi: Exchange Rates, foreign currency per peso, annual data, 1967-89. Source of data: IFS Yearbook 1990 for (1) ... (17) and Key Indicators of Developing Member Countries of ADB for (18) and (19) and Far Eastern Economic Review (FEER) Annual Reports for 1967-73 figures of (19). See Table A1.

(2) PMR: Parallel Market Exchange Rate, annual, 1972-1983, peso per US dollar. Source of data: 1977, 1978 and 1979 issues Pick's Currency Yearbook for 1972-79 figures and various weekly issues of FEER for 1980-83 figures. See Table 9.

(3) CP (Philippines), CPi (ith foreign country): Consumer Price Index (1980 = 100), annual data, 1967-89. Source of data: IFS Yearbook 1990 for RP, (1) ... (17) and Key Indicators of Developing Member Countries of ADB 1989 for (18) and (19). See Table A2.

(4) WP (Philippines), WPi (ith foreign country): Wholesale Price Index (1980 = 100), annual data, 1967-89. Source of data: IFS Yearbook 1990 for RP, (1) ... (15) and (17); no data available for (16), (18) and (19). See Table A3.

(5) Xi, Mi : Direction of Philippine Trade, exports and imports, annual data, 1980-88. Sources of data: DOTS 1990 for (1) ... (19); PSY 1989 for 1980 and 1981 figures for exports (US$100.555M and US$101.559M) and imports (US$182.66oM and US$204.881M). See Table A4.

(6) GXi: Total Exports of Selected Countries (RP, (1) ... (19)), annual data, 1980-88. Source of data: DOTS 1990 and Key Indicators of Developing Member Countries for 1989 for (19). See Table A5.

(7) UVE, UVI: Unit Value of Exports Index (UVE) and Unit Value of Imports (UVI) Index (1972 = 100), 1967-1988. Source of data: IFS Yearbook 1990. See Table A6.

(8) GVA: Gross Value Added, 1972. Source of data: PSY 1989. See Table A7.

(9) PGVA: Implicit Price Index (1972 = 100) of Gross Value Added by Industry Group, 1967-88. Source of data: 1980, 1982 and 1989 issues of PSY. See Table A8.

4.2.2. Monthly data

(1) EIi: Exchange Rates, foreign currency per peso, monthly data, January 1988 - December 1989. Source of data:

various issues of IFS for (1) ... (17) and CB Annual Report 1989 volume I for (18) and (19). See Table A1a.

(2) CP (Philippines), CPi (ith foreign country): Consumer price index (December 1988 = 100), monthly data, January 1988 - December 1989. Source of data: IFS for RP, (1) ... (11), (13) .... (17); no data available for (12), (18) and (19). See Table A2a.

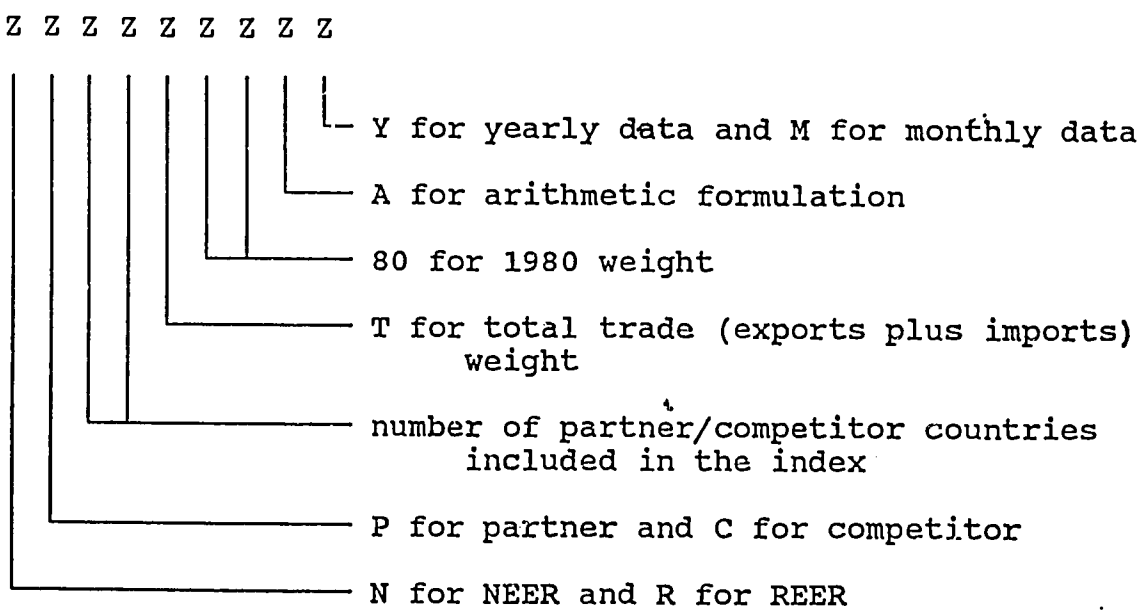
(3) WP (Philippines), WPi (ith foreign country): Wholesale Price Index (December 1988 = 100), monthly data, January 1988 - December 1989. Source of data: IFS for RP, (1) ... (4), (6) ...(15) and (17); no data available for (5), (16), (18) and (19). See Table A3a.

4.3. Results

4.3.1. Nominal and real exchange rate indices (bilateral). The results are shown in Tables 3, 3a, 4, and 4a. Tables 3 and 4 show that the Philippine peso has been depreciating relative to each of the currencies of industrial countries (i = 1 ... 12), in nominal and in real terms. In nominal terms, it has also been depreciating relative to the currencies of Asian neighbors except the currency of Indonesia (i = 13 .... 19, except 14); in real terms, however, the peso has been depreciating relative to Korean won, Malaysian ringit, Singapore dollar, HongKong

dollar, and New Taiwan dollar (i = 13, 16, 17, 18, 19) and has been appreciating relative to Indonesian rupiah and Thai baht (i = 14, 15).

4.3.2. Nominal and real effective exchange rate indices. We use different sets of partner/competitor countries. For the trade weights, see Tables 5 and 6, where wgi is the foreign country i's share in total exports to the world market excluding the market of the home country, wti is the total trade (exports plus imports) weight of country i and wxi is the export weight of country i. The results are shown in Tables 7, 7a, 8, and 8a, where the code indicates the following:



For partner countries, the results using 1980 wxi and wti are the same since wxi and wti patterns are more or less the same. Thus, only the results using wti are presented.

For competitor countries, the results using 1980 wgi and wti are the same since wgi and wti patterns are more or less the same. Again, only the results using wti are presented.

Table 7 shows that the peso has been depreciating relative to the currencies of the four sets of partner countries, in nominal terms, during the period 1967-89; in real terms, there were jumps but generally the peso has been depreciating but not as fast as in nominal terms. The NEERs as well as the REERs for the four sets of partner countries exhibit more or less the same pattern.

Table 8 shows the NEERs and REERs for competitor countries for the period 1967-89. The NEER figures indicate that generally the peso is depreciating relative to the currencies of the four sets of competitor counries. However, the REER figures show that between 1986 to 1989 the peso has been appreciating relative to the currencies of four ASEAN competitors: Indonesia, Thailand, Malaysia, and Singapore (i = 14 ... 17).

4.3.3. Relative Price Indices. Our results for PtPnt and TT are shown in Table 1, where PtPntDO is the same as PtPnt and TTDO is the same as TT. Results show that TT has generally been declining, althought it has been increasing since 1986. PtPnt has been increasing from 1967-1974 and

has been decling since 1974 although there were increases in 1984 and 1985.

4.3.4. Parallel Market Rates. Table 9 shows both the official and the parallel market rates, as well as the real parallel market rate and the real parallel market rate index. Figures show that the peso is more depreciated in the parallel market.

5. Remarks

No single indicator is wholly reliable for assessing exchange rate, but an informed judgment can be made if they are used in combination. Interpretations and conclusions regarding these indices must take into account other developments (market pressures, such as persistent intervention in one direction, rising foreign borrowing, growth of arrears, or stricter rationing of foreign exchange), the stance of other policies and the program objectives, and any necessary structural change.

Table A1, continued.

Exchange Rates: Foreign Currency per Peso, 1967-1989

YEAR	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1967	1.316	0.2291	66.966	36.122	5.2874	0.9384	0.7651	1.5445	10.194
1968	1.315	0.2287	70.394	68.522	5.2902	0.7799	0.7836	1.5420	10.176
1969	1.315	0.2289	73.284	62.907	5.3145	0.7785	0.7836	1.5412	10.173
1970	0.678	0.1520	52.569	61.416	3.5425	0.5213	0.5238	1.0253	6.771
1971	0.714	0.1369	55.975	60.727	3.2539	0.4676	0.4718	0.9402	6.219
1972	0.713	0.1257	58.262	62.174	3.1354	0.4202	0.4214	0.8412	5.993
1973	0.635	0.1043	56.985	61.424	3.0567	0.3615	0.3637	0.7623	5.624
1974	0.654	0.1025	59.587	61.138	3.0017	0.3546	0.3590	0.7479	5.590
1975	0.573	0.1053	66.778	57.258	2.8117	0.3303	0.3272	0.6816	5.243
1976	0.505	0.1097	65.051	55.777	2.7418	0.3416	0.3391	0.6591	5.107
1977	0.605	0.1213	65.381	56.060	2.7557	0.3325	0.3295	0.6298	5.133
1978	0.613	0.1186	65.709	60.014	2.7509	0.3144	0.3087	0.6367	5.030
1979	0.581	0.1213	65.604	84.453	2.7677	0.2966	0.2948	0.6701	4.686
1980	0.563	0.1168	80.868	83.472	2.7260	0.2898	0.2851	0.6630	4.795
1981	0.641	0.1181	86.210	79.973	2.7621	0.2917	0.2674	0.7080	4.665
1982	0.736	0.1151	85.607	77.450	2.6932	0.2735	0.2506	0.8513	4.581
1983	0.690	0.0977	69.300	81.822	2.0697	0.2009	0.1902	0.7037	3.606
1984	0.495	0.0681	48.266	61.436	1.4156	0.1403	0.1277	0.4665	2.371
1985	0.462	0.0767	45.757	59.685	1.4596	0.1334	0.1182	0.4192	2.142
1986	0.349	0.0731	43.239	62.915	1.2901	0.1266	0.1069	0.3826	1.656
1987	0.308	0.0694	39.993	79.924	1.2507	0.1225	0.1024	0.3792	1.548
1988	0.290	0.0665	34.676	79.911	1.1991	0.1241	0.0954	0.3702	1.355
1989	0.297	0.0681	30.891	81.432	1.1824	0.1246	0.0877	n.a.	n.a.

Source: International Financial Statistics, 1990;
Key Indicators of Developing Member Countries of ADB, 1989 for (18) and (17), and
Various FEER annual reports for 1967-1973 figures for (19)

1 - US
2 - Canada
3 - Japan
4 - UK
5 - France
6 - Germany
7 - Netherlands
8 - Belgium
9 - Italy
10 - Switzerland
11 - Sweden
12 - Australia
13 - Korea
14 - Indonesia
15 - Thailand
16 - Malaysia
17 - Singapore
18 - Hongkong
19 - Taiwan

Eji = (1/Eij): foreign currency per peso
filename: EI$A.WK1

Table A1a.

Exchange Rates: foreign currency per peso, 1983-1989 monthly

MONTH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1988									
Jan	0.0480	0.0617	6.1192	0.0266	0.2675	0.0792	0.0890	1.6582	58.241
Feb	0.0478	0.0607	6.1790	0.0272	0.2745	0.0812	0.0912	1.6934	59.814
Mar	0.0476	0.0594	6.0529	0.0260	0.2708	0.0798	0.0896	1.6694	59.036
Apr	0.0476	0.0537	5.9406	0.0253	0.2701	0.0796	0.0893	1.6650	59.068
May	0.0477	0.0590	5.9545	0.0255	0.2736	0.0803	0.0906	1.6896	60.070
Jun	0.0477	0.0581	6.0670	0.0268	0.2827	0.0838	0.0942	1.7525	62.218
Jul	0.0476	0.0574	6.3391	0.0279	0.2956	0.0877	0.0989	1.8370	65.027
Aug	0.0475	0.0581	6.3455	0.0280	0.3035	0.0896	0.1012	1.8786	66.380
Sep	0.0471	0.0577	6.3269	0.0280	0.2989	0.0877	0.0991	1.8423	65.532
Oct	0.0468	0.0564	6.0397	0.0270	0.2911	0.0853	0.0961	1.7861	63.543
Nov	0.0468	0.0557	5.7827	0.0259	0.2793	0.0818	0.0923	1.7136	60.780
Dec	0.0468	0.0560	5.7830	0.0256	0.2806	0.0822	0.0920	1.7230	60.648
1989									
Jan	0.0459	0.0563	5.9615	0.0264	0.2929	0.0858	0.0968	1.7967	62.984
Feb	0.0463	0.0557	5.9526	0.0257	0.2955	0.0867	0.0979	1.8188	63.525
Mar	0.0459	0.0560	6.1079	0.0273	0.2964	0.0874	0.0986	1.8316	64.249
Apr	0.0467	0.0555	6.1677	0.0275	0.2954	0.0873	0.0986	1.8289	64.089
May	0.0453	0.0553	6.4110	0.0284	0.3066	0.0904	0.1018	1.8973	65.723
Jun	0.0461	0.0555	6.5324	0.0297	0.3100	0.0914	0.1029	1.9150	66.255
Jul	0.0457	0.0543	6.4294	0.0282	0.2935	0.0865	0.0976	1.8117	62.640
Aug	0.0457	0.0537	6.4495	0.0286	0.2972	0.0880	0.0993	1.8412	63.731
Sep	0.0455	0.0533	6.6025	0.0290	0.3001	0.0889	0.1002	1.8608	63.967
Oct	0.0455	0.0535	6.4634	0.0287	0.2804	0.0850	0.0960	1.7854	62.353
Nov	0.0453	0.0519	6.4944	0.0288	0.2815	0.0828	0.0934	1.7354	60.795
Dec	0.0448	0.0520	6.4321	0.0281	0.2662	0.0780	0.0881	1.6401	57.918

Source: International Financial Statistics, various monthly issues; and Central Bank Annual Report 1989, vol.I for (18) and (19)

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14 - Indonesia
15 - Thailand
16 - Malaysia
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18 - Hongkong
19 - Taiwan

Eli = (1/Ei): foreign currency per peso
filename: EIEM.WK1

Table A1a, continued.

Exchange Rates: foreign currency per peso, 1988-1989 monthly

MONTH	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1988										
Jan	0.0645	0.2863	0.0673	37.775	79.531	1.2104	0.1218	0.0972	0.3738	1.3561
Feb	0.0666	0.2874	0.0670	37.001	79.472	1.2109	0.1234	0.0965	0.3713	1.3567
Mar	0.0660	0.2829	0.0647	35.833	78.961	1.1991	0.1222	0.0957	0.3715	1.3605
Apr	0.0653	0.2797	0.0636	35.273	79.206	1.1957	0.1224	0.0953	0.3720	1.3607
May	0.0673	0.2817	0.0613	35.139	79.727	1.2002	0.1233	0.0959	0.3740	1.3669
Jun	0.0697	0.2935	0.0590	34.821	80.109	1.2057	0.1234	0.0963	0.3706	1.3674
Jul	0.0729	0.3013	0.0595	34.521	80.406	1.2129	0.1249	0.0973	0.3714	1.3587
Aug	0.0752	0.3074	0.0589	34.323	80.559	1.2129	0.1259	0.0969	0.3703	1.3626
Sep	0.0742	0.3036	0.0591	33.673	80.112	1.2016	0.1254	0.0960	0.3662	1.3537
Oct	0.0722	0.2938	0.0579	33.206	80.039	1.1869	0.1255	0.0946	0.3652	1.3362
Nov	0.0687	0.2848	0.0551	32.418	79.974	1.1753	0.1252	0.0917	0.3654	1.3123
Dec	0.0692	0.2844	0.0545	32.077	80.020	1.1777	0.1262	0.0910	0.3659	1.3172
1989										
Jan	0.0730	0.2931	0.0539	31.975	81.337	1.1856	0.1275	0.0909	0.3654	1.2882
Feb	0.0738	0.2957	0.0547	31.679	81.566	1.1876	0.1279	0.0902	0.3654	1.2928
Mar	0.0753	0.2983	0.0574	31.537	82.070	1.1925	0.1271	0.0909	0.3651	1.2753
Apr	0.0767	0.2971	0.0581	31.165	81.990	1.1918	0.1275	0.0910	0.3609	1.2058
May	0.0803	0.3053	0.0600	30.883	81.307	1.1932	0.1250	0.0907	0.3602	1.1935
Jun	0.0759	0.3034	0.0610	30.752	81.711	1.1956	0.1250	0.0903	0.3574	1.1795
Jul	0.0745	0.2957	0.0603	30.488	81.034	1.1787	0.1225	0.0875	0.3568	1.1669
Aug	0.0760	0.2998	0.0600	30.548	81.367	1.1815	0.1226	0.0895	0.3571	1.1613
Sep	0.0763	0.3005	0.0590	30.499	81.360	1.1829	0.1229	0.0899	0.3557	1.1566
Oct	0.0743	0.2938	0.0588	30.569	81.411	1.1771	0.1228	0.0894	0.3535	1.1629
Nov	0.0732	0.2906	0.0578	30.424	81.199	1.1700	0.1223	0.0886	0.3514	1.1677
Dec	0.0703	0.2817	0.0570	30.229	80.390	1.1527	0.1211	0.0859	0.3479	1.1646

Source: International Financial Statistics, various monthly issues; and
Central Bank Annual Report 1989, vol.I for (18) and (19)

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16 - Malaysia
17 - Singapore
18 - Hongkong
19 - Taiwan

Eli = (1/Ei): foreign currency per peso
filename: EI&M.WK1

Table A2, continued.

Consumer Price Index for Selected Countries, 1967-1989
(base year: 1980)

YEAR	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1967	56.6	36.9	34.3	15.4	6.8	37.9	55.7	53.1	38.8	n.a.
1968	58.0	37.7	34.3	16.9	15.7	38.5	55.6	53.4	39.7	n.a.
1969	59.4	38.6	35.8	19.2	18.1	39.5	55.3	53.3	41.1	n.a.
1970	61.5	41.4	37.3	22.1	20.3	39.4	56.3	53.5	44.0	n.a.
1971	65.6	44.5	36.6	25.1	21.5	39.6	57.3	54.5	45.6	n.a.
1972	69.9	47.2	41.8	28.1	22.7	41.5	59.1	55.6	48.3	n.a.
1973	76.1	50.3	46.3	29.1	29.7	48.6	65.4	66.6	57.1	n.a.
1974	83.5	55.4	52.2	36.1	41.8	59.7	76.8	81.5	65.5	n.a.
1975	89.2	66.8	61.2	45.1	49.8	62.9	86.2	83.6	67.2	n.a.
1976	90.7	66.9	63.7	52.6	59.6	65.4	82.3	82.1	69.8	67.6
1977	91.3	74.6	77.6	57.4	66.3	70.4	86.2	84.6	73.7	72.3
1978	92.7	82.2	83.6	65.7	71.7	76.0	90.5	88.8	78.0	76.5
1979	96.1	88.6	91.0	77.7	84.7	83.5	93.7	92.3	87.1	84.6
1980	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1981	106.4	112.2	116.4	121.4	112.2	112.6	109.7	108.4	113.8	116.2
1982	112.5	121.9	122.4	130.0	122.9	116.5	116.1	112.5	125.8	119.8
1983	115.8	132.6	134.3	134.5	137.3	123.6	126.3	113.9	138.3	121.3
1984	119.3	143.2	140.3	137.7	151.8	124.6	125.1	116.8	150.1	121.3
1985	123.3	155.9	149.2	141.6	159.6	127.1	125.5	117.4	155.2	121.1
1986	124.3	166.3	162.7	145.6	168.2	129.3	126.4	115.8	160.1	122.0
1987	126.6	167.1	176.1	149.4	185.8	132.6	127.5	116.3	168.6	122.6
1988	128.4	176.8	189.5	160.1	198.6	137.7	130.0	118.1	181.1	124.1
1989	132.5	188.2	203.6	169.1	211.4	145.1	133.6	120.9	n.a.	n.a.

Source: International Financial Statistics, 1990
note: (18) & (19) from Key Indicators of Developing Member Countries of ADB, 1989

1 - US
2 - Canada
3 - Japan
4 - UK
5 - France
6 - Germany
7 - Netherlands
8 - Belgium
9 - Italy
10 - Switzerland
11 - Sweden
12 - Australia
13 - Korea
14 - Indonesia
15 - Thailand
16 - Malaysia
17 - Singapore
18 - Hongkong
19 - Taiwan

filename: CPI80.WK1

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Table A2a.

CONSUMER PRICE INDEX, 1965-1989 monthly
(December 1980 = 100)

MONTH	Phils.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1966									
Jan	93.1	96.0	96.3	98.7	93.7	97.1	98.6	98.6	98.1
Feb	93.9	96.3	96.7	98.5	94.6	97.3	98.9	98.7	98.3
Mar	94.5	96.7	97.2	98.9	94.4	97.6	98.9	99.1	98.4
Apr	94.7	97.2	97.5	99.4	96.0	98.1	99.2	99.4	98.8
May	95.1	97.5	98.1	99.4	96.3	98.3	99.3	99.4	98.9
Jun	96.1	97.4	98.3	99.3	96.6	98.6	99.5	99.1	99.0
Jul	96.7	98.3	98.9	99.1	96.7	99.0	99.4	99.1	99.3
Aug	97.1	98.8	99.2	99.4	97.8	99.3	99.5	99.6	99.5
Sep	97.0	99.4	99.2	100.2	98.2	99.5	99.5	99.9	99.7
Oct	97.3	99.7	99.7	100.7	99.2	99.7	99.5	99.9	99.7
Nov	98.9	99.8	100.6	100.3	99.7	99.8	99.8	100.1	99.6
Dec	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1969									
Jan	101.5	100.4	100.5	99.8	100.6	100.4	101.1	99.0	100.4
Feb	101.9	100.9	101.1	99.5	101.4	100.7	101.4	99.3	100.9
Mar.	101.8	101.5	101.7	100.0	101.8	101.0	101.6	99.7	101.0
Apr	102.4	102.1	102.0	101.8	103.6	101.6	102.2	100.2	101.7
May	103.4	102.8	103.0	102.4	104.2	102.0	102.4	100.2	101.8
Jun	105.4	102.9	103.6	102.3	104.6	102.1	102.8	100.1	102.0
Jul	106.7	103.2	104.3	102.1	104.7	102.5	102.4	100.4	102.4
Aug	108.5	103.4	104.4	102.0	104.9	102.5	102.3	100.7	102.7
Sep	109.3	103.8	104.4	102.8	105.7	102.8	102.5	101.2	103.2
Oct	110.3	104.2	104.9	103.6	106.4	103.3	102.7	101.3	103.3
Nov	111.5	104.5	105.2	102.6	107.4	103.4	102.9	101.3	103.2
Dec	114.0	104.0	105.1	102.6	107.0	105.5	103.2	101.3	103.6

Source: International Financial Statistics, various monthly issues
note: data for 12, 18 and 19 not available

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14 - Indonesia
15 - Thailand
16 - Malaysia
17 - Singapore
18 - Hongkong
19 - Taiwan

filename: CPI500.xls

Table A2a, continued.

CONSUMER PRICE INDEX, 1988-1989 monthly
(December 1988 = 100)

MONTH	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
1988								
Jan	95.4	98.4	94.8	93.8	95.0	96.6	97.4	98.5
Feb	95.8	98.8	95.5	95.3	95.5	97.0	97.6	99.3
Mar	96.2	99.3	95.9	96.6	95.6	97.9	97.7	98.9
Apr	96.5	99.0	96.8	96.4	96.3	98.3	97.[illegible]	98.9
May	96.8	99.1	97.1	97.0	97.2	98.4	98.[illegible]	99.3
Jun	97.1	99.1	97.5	97.7	97.0	98.5	97.[illegible]	99.2
Jul	97.3	98.9	97.9	97.9	98.7	98.6	98.5	99.8
Aug	97.7	99.2	98.0	98.3	99.1	99.1	98.6	99.7
Sep	98.2	99.3	98.8	98.5	99.0	100.0	98.9	99.8
Oct	98.9	99.4	99.6	98.4	99.4	100.5	98.8	99.6
Nov	99.6	99.7	99.7	99.1	99.8	100.2	99.2	99.7
Dec	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1989								
Jan	00.7	100.0	101.1	100.2	100.5	100.5	100.0	100.0
Feb	101.5	101.0	101.7	100.5	102.0	101.8	100.1	100.3
Mar	102.1	101.2	102.0	101.2	102.0	101.8	100.5	100.3
Apr	102.6	101.8	103.1	101.6	103.7	102.1	100.5	101.0
May	103.1	101.9	103.5	102.9	104.3	102.8	100.9	101.8
Jun	103.5	102.0	103.8	103.1	104.1	103.4	100.9	102.0
Jul	103.7	101.9	103.8	103.0	104.5	104.7	101.2	102.2
Aug	103.9	102.2	104.2	103.8	104.0	105.8	100.9	102.4
Sep	104.4	102.7	105.1	104.7	104.9	106.3	101.1	102.4
Oct	105.3	103.0	105.9	105.0	105.6	106.8	101.2	102.7
Nov	105.9	104.3	106.2	105.2	106.2	106.7	101.8	103.2
Dec	106.3	105.0	106.5	105.1	106.1	106.1	102.1	103.3

Source: International Financial Statistics, various monthly issues
note: data for 12, 18 and 19 not available

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19 - Taiwan

filename: CPIM88.WK1

Table A3.

Wholesale Price Index for Selected Countries, 1967-1987
(base year: 1980)

YEAR	Phils.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1967	18.02	37.20	36.56	45.27	24.38	39.19	57.39	54.57	63.09
1968	18.31	38.13	37.34	45.67	25.35	38.55	56.50	55.54	63.21
1969	18.31	39.51	33.76	45.67	26.32	42.74	53.00	54.20	66.46
1970	22.67	40.99	39.86	48.36	27.98	45.97	50.81	56.76	69.66
1971	26.15	42.37	40.44	47.96	30.47	45.94	63.37	59.20	69.21
1972	28.78	44.32	43.25	43.36	32.13	49.03	65.68	62.36	72.10
1973	35.47	50.06	47.03	56.02	34.49	56.29	69.35	66.50	80.95
1974	52.62	59.47	55.94	73.63	42.66	72.74	78.75	72.96	94.51
1975	55.52	64.93	62.14	75.82	52.49	68.55	82.30	77.83	95.73
1976	63.08	68.06	65.37	79.70	60.94	73.55	85.35	83.92	102.44
1977	67.73	72.22	70.54	81.19	72.02	77.74	87.79	88.92	104.83
1978	70.93	77.34	77.00	79.10	75.09	81.13	88.77	90.01	102.90
1979	84.59	87.60	88.24	84.88	87.67	91.94	93.64	92.45	109.45
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	114.53	109.07	110.21	101.39	109.56	110.97	107.81	107.31	114.62
1982	126.74	111.25	116.93	103.18	118.01	123.23	114.16	113.40	129.42
1983	147.09	112.63	120.93	100.90	124.38	136.94	115.87	114.06	138.11
1984	245.93	115.33	125.84	100.60	131.58	155.00	119.19	119.85	148.63
1985	290.70	114.81	129.20	99.50	138.50	161.29	122.10	121.80	152.44
1986	286.05	111.48	130.23	90.45	144.46	n.a.	119.05	120.95	134.91
1987	312.21	114.35	133.72	87.06	150.00	n.a.	116.12	117.05	128.20
1988	354.07	119.06	138.89	86.17	156.79	n.a.	117.58	117.78	130.34
1989	391.57	124.91	142.64	88.36	164.82	n.a.	121.25	121.80	138.87

Source: International Financial Statistics, 1990
note: data for 16, 18 and 19 not available

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17 - Singapore
18 - Hongkong
19 - Taiwan

Table A3, continued.

Wholesale Price Index for Selected Countries, 1967-1989
(base year: 1980)

YEAR	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(17)
1967	21.42	66.74	n.a.	n.a.	14.83	n.a.	35.74	n.a.
1968	21.59	66.74	34.92	n.a.	16.05	n.a.	34.10	n.a.
1969	22.28	68.73	36.51	34.66	17.07	n.a.	35.19	n.a.
1970	24.01	71.56	38.10	36.30	18.74	n.a.	34.97	n.a.
1971	24.87	73.07	39.68	38.16	20.28	14.92	35.08	n.a.
1972	25.73	75.83	41.27	39.89	23.11	16.89	37.81	n.a.
1973	30.40	83.99	46.03	43.47	24.78	23.44	46.56	n.a.
1974	42.82	97.25	57.14	50.07	35.17	34.59	60.00	65.46
1975	46.46	95.17	60.32	57.53	44.42	36.72	62.19	64.53
1976	57.17	94.59	66.67	64.13	49.81	42.13	64.70	68.81
1977	66.67	94.32	73.02	70.59	54.30	48.20	69.73	71.97
1978	72.19	91.60	79.37	76.47	60.59	52.79	74.86	73.09
1979	83.42	95.05	87.30	87.66	72.02	78.85	83.28	83.61
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	116.75	105.75	111.11	108.46	120.41	111.15	109.42	103.82
1982	132.82	108.52	125.40	118.12	126.06	119.34	110.60	99.44
1983	145.77	108.90	139.68	127.69	126.32	140.66	112.79	95.81
1984	160.97	112.54	150.79	134.58	127.21	156.23	109.29	95.25
1985	172.71	115.07	158.73	143.47	128.37	163.93	109.29	93.11
1986	171.16	110.59	153.97	151.51	126.44	167.54	108.85	79.05
1987	175.65	108.29	158.73	162.55	127.09	198.36	115.30	95.01
1988	183.94	110.70	166.67	174.61	130.55	212.79	124.8	83.43
1989	195.69	115.54	179.37	186.23	132.40	227.54	130.49	85.57

Source: International Financial Statistics, 1990
note: data for 16, 18 and 19 not available

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18 - Hongkong
19 - Taiwan

Table A3a.

WHOLESALE PRICE INDEX, 1988-1989 monthly
(December 1988 = 100)

MONTH	Phils.	(1)	(2)	(3)	(4)	(6)	(7)	(8)
1988								
Jan	92.3	95.7	96.8	100.5	96.7	98.2	97.7	103.7
Feb	92.0	95.8	96.6	100.4	97.0	98.2	97.7	103.7
Mar	93.5	96.0	96.6	100.5	97.5	98.2	97.8	103.6
Apr	93.4	96.8	97.6	100.2	98.2	98.5	98.0	103.5
May	93.7	97.5	97.8	100.0	98.5	98.8	98.2	103.5
Jun	95.5	98.5	98.1	100.3	98.2	99.1	98.5	104.9
Jul	96.2	95.9	98.6	100.9	98.6	99.2	98.8	105.9
Aug	95.7	99.1	98.7	101.0	99.0	99.3	99.2	106.4
Sep	95.4	99.1	99.1	101.2	99.4	99.5	99.5	106.6
Oct	94.6	99.2	99.3	100.6	99.6	99.6	99.5	98.7
Nov	97.4	99.3	99.6	100.0	99.8	99.8	99.9	99.7
Dec	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1989								
Jan	101.4	101.1	100.5	100.3	100.9	101.0	100.6	101.9
Feb	100.1	101.6	100.5	100.7	101.2	101.2	100.9	103.3
Mar	99.1	102.3	100.5	100.9	101.6	101.5	101.1	103.1
Apr	99.6	103.0	100.9	102.7	102.1	102.1	102.1	104.0
May	101.2	103.7	n.a.	103.4	102.5	102.2	102.2	104.8
Jun	101.5	103.4	100.9	104.1	102.8	102.1	102.4	104.0
Jul	102.2	103.3	101.0	104.1	103.1	102.2	102.2	103.4
Aug	111.0	102.7	103.0	104.1	103.6	102.3	102.6	104.2
Sep	109.3	103.0	100.9	104.5	104.0	102.5	102.0	105.4
Oct	110.8	103.3	100.8	103.9	104.5	103.0	102.9	104.6
Nov	107.1	103.3	100.6	103.8	104.8	102.9	102.4	103.5
Dec	104.6	103.6	100.5	103.9	105.0	102.9	102.2	103.6

Source: International Financial Statistics, various monthly issues
note: data for 5, 16, 18 and 19 not available

1 - US
2 - Canada
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4 - UK
5 - France
6 - Germany
7 - Netherlands
8 - Belgium
9 - Italy
10 - Switzerland
11 - Sweden
12 - Australia
13 - Korea
14 - Indonesia
15 - Thailand
17 - Singapore
18 - Hongkong
19 - Taiwan

filename: WPIMAB.WK1

Table A3a, continued.

WHOLESALE PRICE INDEX, 1988-1989 monthly
(December 1988 = 100)

MONTH	(9)	(10)	(11)	(12)	(13)	(14)	(15)	(17)
1988								
Jan	94.8	96.1	94.5	94.9	98.3	n.a.	96.6	102.1
Feb	95.2	96.5	95.1	95.7	98.9	n.a.	97.3	101.5
Mar	95.4	97.2	95.1	96.3	98.7	n.a.	97.1	100.6
Apr	96.0	97.2	95.7	96.8	98.4	n.a.	98.0	102.6
May	96.4	97.5	96.3	97.3	98.8	n.a.	98.4	103.3
Jun	96.7	97.9	97.2	97.4	98.9	98.0	98.7	102.5
Jul	97.0	97.9	97.2	97.8	99.3	98.7	99.0	101.6
Aug	97.6	97.9	98.1	98.6	99.8	98.7	99.7	101.2
Sep	98.1	98.7	99.1	99.3	99.5	98.7	100.6	100.2
Oct	98.5	99.1	99.1	99.8	98.9	99.3	101.0	97.2
Nov	99.4	99.3	100.0	99.8	99.5	100.0	100.4	98.5
Dec	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100.0
1989								
Jan	100.8	100.6	101.9	100.5	99.8	100.6	99.8	101.8
Feb	101.6	100.7	102.8	101.5	100.0	102.0	101.1	101.2
Mar	102.1	101.7	103.7	102.3	100.0	102.6	101.3	102.8
Apr	102.6	102.3	104.6	102.9	100.4	103.9	101.6	105.4
May	103.2	102.7	105.6	104.3	100.8	105.2	103.3	104.6
Jun	103.4	102.3	104.6	104.7	100.8	105.8	105.F	103.8
Jul	103.2	102.0	105.6	105.3	100.1	106.5	105.9	103.4
Aug	103.6	102.2	104.6	105.4	100.5	105.8	106.0	102.8
Sep	104.0	102.5	105.6	105.7	101.1	105.8	105.5	103.3
Oct	104.9	102.6	106.5	106.2	101.3	106.5	105.0	104.5
Nov	105.0	102.5	106.5	106.8	101.0	107.8	103.6	104.4
Dec	105.4	103.1	106.5	106.2	101.1	107.8	103.3	104.5

Source: International Financial Statistics, various monthly issues
note: data for 5, 16, 18 and 19 not available

1 - US
2 - Canada
3 - Japan
4 - UK
5 - France
6 - Germany
7 - Netherlands
8 - Belgium
9 - Italy
10 - Switzerland
11 - Sweden
12 - Australia
13 - Korea
14 - Indonesia
17 - Singapore
18 - Hongkong
19 - Taiwan

filename: WPIN88.WK1

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Table A4.

Direction of Philippine Trade (in million US dollars), 1980-1989

YEAR	Phils.		(1)		(2)		(3)		(4)	
	exports	imports	exports	imports	exports	imports	exports	imports	exports	imports
1980	5787.0	5031.5	1593.6	1950.9	64.2	80.2	1540.0	1651.3	146.6	190.5
1981	5720.7	4970.8	1770.8	1930.6	90.2	77.5	1253.9	1608.9	193.1	175.9
1982	5019.8	8262.5	1588.5	1860.9	58.3	82.0	1149.1	1661.9	189.9	173.3
1983	4932.0	7863.0	1792.6	1831.3	69.1	62.5	983.7	1342.1	233.7	177.8
1984	5342.6	6262.1	2031.5	1713.5	80.6	52.0	1034.4	851.1	223.9	147.3
1985	4614.0	5351.4	1659.3	1343.8	73.8	36.2	974.5	749.5	166.3	106.7
1986	4806.8	5211.0	1709.3	1293.4	68.6	44.7	851.6	886.6	228.3	110.3
1987	5696.1	6936.8	2060.4	1539.4	82.8	97.3	980.4	1148.5	245.4	147.8
1988	7034.2	8661.8	2512.0	1822.6	107.6	90.7	1415.5	1503.0	325.7	170.4
1989	7753.9	11165.	2934.6	2133.1	126.8	178.3	1581.4	2174.0	325.7	181.3

YEAR	(5)				(7)		(8)		(9)	
	exports	imports	exports	imports	exports	imports	exports	imports	exports	imports
1980	94.9	94.1	255.1	345.4	365.8	118.9	34.4	36.4	66.7	70.0
1981	84.4	136.4	240.3	336.2	319.6	82.1	20.3	41.4	50.0	64.8
1982	82.4	106.4	202.8	355.9	189.9	92.3	13.9	43.9	34.3	50.3
1983	91.3	93.8	208.3	379.5	221.6	82.8	13.1	61.3	37.0	56.5
1984	95.8	135.6	175.5	203.4	167.5	56.6	11.9	89.4	27.8	25.8
1985	87.3	74.0	174.1	148.7	145.0	45.4	12.2	21.8	28.4	33.7
1986	109.8	80.2	240.6	216.6	214.4	73.8	16.6	31.9	24.4	24.1
1987	125.3	128.6	290.9	282.1	310.4	92.4	20.2	49.1	35.5	36.1
1988	164.1	128.8	297.3	342.0	314.4	135.5	34.8	72.1	40.0	117.6
1989	151.4	174.9	333.3	436.2	326.7	215.0	54.1	97.54	47.6	71.8

Source: Direction of Trade Statistics, 1990

1 - US	5 - France	9 - Italy	13 - Korea	17 - Singapore
2 - Canada	6 - Germany	10 - Switzerl	14 - Indonesi	18 - Hongkong
3 - Japan	7 - Netherlan	11 - Sweden	15 - Thailand	19 - Taiwan
4 - UK	8 - Belgium	12 - Australi	16 - Malaysia	

filename: XMDOTS.WK1

Table A4, continued.

Direction of Philippine Trade (in million US dollars), 1980-1989

YEAR	(10)		(11)		(12)		(13)		(14)	
	exports	imports	exports	imports	exports	imports	exports	imports	exports	imports
1980	10.2	47.4	17.7	70.2	98.0	244.4	203.0	145.5	107.2	187.0
1981	12.2	44.0	19.4	47.8	121.7	243.3	193.3	118.1	153.6	232.6
1982	8.6	53.5	18.7	37.6	87.5	256.1	151.5	160.6	55.0	152.8
1983	9.1	45.8	15.2	34.7	76.0	197.0	148.7	151.3	30.1	176.8
1984	10.6	35.7	19.2	21.9	89.1	143.6	98.7	155.3	8.3	199.0
1985	30.3	37.7	13.6	18.6	80.5	177.5	75.0	214.0	18.3	189.8
1986	13.5	57.8	12.9	20.4	68.5	161.6	112.3	168.3	27.9	137.4
1987	10.5	70.9	14.0	25.2	80.4	220.2	98.3	201.0	64.8	92.1
1988	12.9	75.3	16.3	29.7	109.7	309.4	160.5	347.8	75.4	161.1
1989	12.1	59.7	17.3	37.4	123.8	393.1	148.4	444.6	57.0	179.5

YEAR	(15)		(16)		(17)		(18)		(19)	
	exports	imports	exports	imports	exports	imports	exports	imports	exports	imports
1980	63.0	22.0	94.4	162.1	112.6	85.6	192.0	203.1	n.a.	n.a.
1981	25.3	28.4	104.1	182.4	129.2	132.5	221.7	224.0	n.a.	n.a.
1982	14.4	32.6	177.8	122.0	111.6	114.1	197.9	219.6	54.7	231.8
1983	19.9	50.4	162.1	158.9	139.3	230.1	158.4	264.9	74.6	224.8
1984	9.0	50.8	178.0	354.5	321.3	298.8	234.2	242.4	90.6	182.6
1985	83.1	55.6	173.7	390.2	249.8	119.4	186.6	209.2	85.6	183.4
1986	66.7	29.9	97.0	215.1	153.6	126.8	220.0	258.5	123.5	208.2
1987	124.7	44.2	117.0	233.5	196.4	237.4	277.0	308.6	144.2	371.5
1988	123.3	56.1	116.5	246.9	220.8	353.1	343.8	388.6	200.4	532.0
1989	154.8	90.3	99.7	282.6	271.3	519.6	302.0	500.3	210.0	730.3

Source: Direction of Trade Statistics, 1990

1 - US
2 - Canada
3 - Japan
4 - UK
5 - France
6 - Germany
7 - Netherlan
8 - Belgium
9 - Italy
10 - Switzerl
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13 - Korea
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15 - Thailand
16 - Malaysia
17 - Singapore
18 - Hongkong
19 - Taiwan

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Table A5.

Total Exports of Selected Countries, 1980-1989 (in million US dollars)

YEAR	Phils.	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1980	5787	220701	67730	130435	110070	116014	192061	73942	64654	77676
1981	5721	233739	72776	151500	102266	106425	176086	66743	55615	75284
1982	5020	212274	71234	133443	96748	96673	176432	66324	52363	73405
1983	4932	200528	76745	146992	91639	94945	169436	64711	51992	72728
1984	5343	217809	90293	169748	93862	97566	171724	65792	51817	73303
1985	4614	213146	90780	177189	101249	101674	183910	68216	53679	79020
1986	4807	217292	89706	210718	107083	124945	243315	80556	60819	97827
1987	5696	252984	98104	231332	131242	148303	294165	92703	83005	116330
1988	7034	319952	116571	264961	145136	168620	323375	103040	92083	128706
1989	7754	363807	120673	274597	152339	178967	341389	107299	99707	141034

YEAR	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1980	29643	30892	22031	17505	21909	6501.3	12960	19377	19724	19975
1981	27037	28566	21796	21271	23910	7026.9	11773	20970	21796	22521
1982	26014	26830	22077	21827	22329	6934.6	12044	20787	20893	22091
1983	25507	27454	20651	24460	21146	6367.7	14128	21832	21949	25097
1984	25849	29362	23875	29259	21881	7414.2	16563	24070	23314	30427
1985	27447	30138	22611	30289	18597	7122.9	15408	22812	30182	30691
1986	37456	37169	22541	34792	14809	8864.3	13977	22501	35438	39759
1987	45500	44390	26533	47301	17170	11563.	17934	28696	48473	53559
1988	50621	49675	32751	60679	19376	15755.	21096	39318	63182	69495
1989	51547	51802	37037	62371	21936	20028.	25049	44769	73114	n.a.

Source: Direction of Trade Statistics, 1987, 1990 (DOTS world total)
: Key Indicators of Developing Member Countries of ADB, 1989 for (19)

filename: XDOTS.WK1

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Table A6.
Unit Value of Exports (UVE) and Unit Value of Imports (UVI) :

	UVE	UVI
1967	59.69	47.47
1968	63.84	51.52
1969	63.84	52.53
1970	97.74	82.83
1971	101.69	91.92
1972	100.00	100.00
1973	147.46	120.30
1974	245.76	214.14
1975	209.04	237.37
1976	187.57	241.41
1977	189.27	266.67
1978	211.30	269.70
1979	260.45	318.18
1980	276.27	402.02
1981	294.18	469.70
1982	255.37	434.34
1983	348.59	567.68
1984	577.40	963.64
1985	564.97	1010.10
1986	554.24	922.22
1987	608.47	929.29
1988	681.36	957.50
1989	697.18	953.54

Source of Data: IFS Yearbook, 1990. Figures rebased such that 1972 value equals 100.

Table A7.
Gross Value Added (GVA), by Industry, 1972 (in 1972 million pesos).

	Industry	GVA	wgva
1	Agriculture, fishery and forestry	16,135	0.51230
2	Mining and quarrying	1,346	0.04274
3	Manufacturing	14,014	0.44496
	Subtotal for traded good sector	31,495	1.00000
4	Construction	2,240	0.12843
5	Electricity, gas and water	468	0.02683
6	Transport, communication and storage	2,732	0.15663
7	Finance and housing	4,515	0.25886
8	Other services	7,487	0.42925
	Subtotal for nontraded good sector	17,442	1.00000

Source of data: Philippine Statistical Yearbook, 1989.

Table A8.

Implicit Price Index of Gross Value Added by Industry Group, 1967-1988 (base year: 1972)

	PGVA1 Agri, Fishery & Forestry	PGVA2 Mining and Quarrying	PGVA3 Mfg	PGVA4 Cons-truction	PGVA5 Elect., gas and water	PGVA6 Tranport, comm. & storage	PGVA7 Finance and Housing	PGV Othe servic
967	57.8	65.7	62.3	68.0	84.9	72.6	71.8	74
968	64.2	67.1	61.2	75.2	84.7	78.2	72.6	76
969	70.0	78.7	67.2	78.8	86.6	76.3	73.7	79
970	80.0	108.1	81.0	87.2	78.9	86.7	85.5	84
971	95.6	92.6	90.5	94.3	85.2	99.5	93.2	94
972	100.0	100.0	100.0	100.0	100.0	100.0	100.0	100
973	123.8	171.9	116.1	113.2	112.6	109.6	116.1	105
974	168.3	220.7	134.0	171.5	161.1	124.9	156.5	124
975	161.2	138.4	162.2	172.1	174.1	161.6	170.2	139
976	190.1	142.7	188.0	189.9	190.6	183.6	182.1	160
977	202.1	142.8	196.3	[illegible]	200.3	198.7	198.7	172
978	218.9	186.2	207.0	211.8	222.5	219.8	220.9	187
979	245.7	272.3	234.5	249.4	252.1	268.3	253.1	211
980	261.0	362.0	278.7	296.5	299.8	349.7	289.4	240
981	282.0	314.9	313.7	333.5	333.2	389.2	324.7	271
982	302.3	302.9	338.8	362.7	372.9	413.9	360.5	302
983	340.3	357.1	379.1	399.7	440.7	462.9	395.9	331
984	549.0	553.5	588.6	532.0	594.6	672.1	607.8	417
985	619.1	652.1	698.8	646.0	766.6	772.5	753.3	535
986	675.4	790.7	714.5	670.8	851.9	769.0	790.1	592
987	636.4	879.1	742.4	703.7	918.4	809.4	831.1	653
988	684.1	990.5	831.5	774.5	1006.9	819.6	891.0	754

Sources: Philippine Statistical Yearbook (PSY), 1980, 1982, 1989
1967-69: PSY 1980
1970-74: PSY 1982
1975-88: PSY 1989

Table 1.

Revalidation/Update: Dohner et al (1988)

	(1) $PtPnt_{po}$	(2) TT_{po}	(3) $REERP_{po}$	(4) $REERC_{po}$	(1)' $PtPnt_{po}'$	(2)' TT_{po}'	(3)' $REERP_{po}'$	(4)' $REERC_{po}'$
1967	88	184	74	86	84	183	93	84
1968	91	178	74	87	87	180	93	90
1969	95	175	75	89	91	175	95	91
1970	100	172	110	121	98	171	121	122
1971	103	161	108	115	100	161	117	110
1972	103	145	101	109	102	145	122	110
1973	113	164	109	117	113	164	121	114
1974	119	167	97	109	119	167	99	108
1975	115	128	105	116	112	128	106	116
1976	110	113	103	113	108	113	100	119
1977	108	103	102	110	105	103	102	116
1978	105	113	109	113	105	113	113	119
1979	104	119	102	105	104	119	104	107
1980	100	100	100	100	100	100	100	100
1981	96	87	97	101	97	87	95	101
1982	94	86	92	101	94	86	99	101
1983	96	88	110	118	97	88	101	115
1984	106	87	110	118	110	87	90	115
1985	101	81	97	101	103	81	84	99
1986	95	87	118	109	96	87	107	107
1987	93	94	124	111	97	94	108	106
1988					96	103	106	110
1989						106	98	110

(1), (2), (3), (4): Source, Dohner et al (1988). Figures rebased such that 1980 value equals 100.

(1)' $PtPnt_{po}' = (0.5123PGVA1 + 0.04274PGVA2 + 0.44496PGVA3)/(0.12843PGVA4 + 0.02683PGVA5 + 0.15663PGVA6 + 0.25884PGVA7 + 0.42925PGVA8)$

(2)' TT_{po}' = unit value of exports divided by unit value of imports

(3)' $REERP_{po}' = \Sigma wxiWPiRi/WP$; i = 1,3,6,7,13; wxi = 1980 export weights

(4)' $REERC_{po}' = \Sigma wxiCPiRi/CP$; i = 13 to 15,16,17; wxi = 1980 export weights

Table 2,
Revalidation/Update: CB

		(1) $NEERP_{cu}$	(2) $REERP_{cu}$	(1)' $NEERP_{cu}'$	(2)' $REERP_{cu}'$
1988	Jan	102.83	99.33	103.39	99.04
	Feb	103.41	100.62	103.99	100.38
	Mar	102.02	99.59	102.45	99.13
	Apr	101.24	98.65	101.51	97.87
	May	101.65	99.48	101.92	98.53
	Jun	102.66	100.97	103.16	100.68
	Jul	104.52	103.21	105.52	103.43
	Aug	104.65	103.50	105.76	103.71
	Sep	103.87	101.76	105.04	102.26
	Oct	101.95	99.68	102.31	99.45
	Nov	99.93	98.90	99.78	98.67
	Dec	100.00	100.00	100.00	100.00
1989	Jan	101.33	103.01	101.74	103.05
	Feb	101.63	103.51	102.00	103.60
	Mar	102.41	103.68	103.12	104.02
	Apr	102.34	103.56	103.40	103.72
	May	103.54	105.19	105.25	106.02
	Jun	104.79	107.85	106.94	109.76
	Jul	102.50	106.88	104.33	108.34
	Aug	102.89		104.70	110.49
	Sep	103.54		105.77	111.86
	Oct	102.47		104.37	110.77
	Nov	102.08		104.12	111.98
	Dec	100.46		102.61	112.70

(1),(2): Source: CB; figures rebased such that December 1988 value equals 100.
(1)' $NEERP_{cu}' = \Sigma wtiRIi$; i = 1,3,4,6; wti = 1980 total trade weights
(2)' $REERP_{cu}' = NEERP_{cu}'/(\Sigma wtiCPi/CP)$; i = 1,3,4,6; wti = 1980 total trade weights

Table 3.

Exchange Rate Index: Foreign Currency per Peso, 1967-1989
(Base year: 1980 = 100)

YEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)
1967	151.44	176.62	305.76	167.14	272.91	419.81	348.28	375.26	139.51	494.26
1968	191.13	176.14	303.97	155.74	273.56	419.74	349.00	376.34	139.13	497.31
1969	191.03	175.93	301.93	165.91	235.05	412.50	348.21	327.51	139.93	491.70
1970	127.15	113.55	200.79	173.44	166.34	255.06	231.75	215.68	93.12	327.01
1971	116.79	100.87	179.17	111.15	157.35	273.71	205.78	194.07	84.33	286.53
1972	112.54	95.78	150.47	104.64	134.49	197.40	181.67	169.38	76.64	256.49
1973	111.18	95.10	133.77	105.46	117.79	163.46	156.33	148.18	75.69	209.97
1974	110.66	92.56	147.55	110.05	176.08	157.53	149.64	147.40	84.03	196.33
1975	103.64	90.16	135.65	108.51	165.13	140.77	131.83	139.34	79.00	159.64
1976	100.96	85.14	152.04	130.02	114.18	139.84	134.76	133.28	98.12	150.59
1977	101.47	92.79	176.16	135.77	100.70	179.67	175.26	124.37	104.55	145.54
1978	101.98	99.49	94.65	123.56	103.92	112.68	110.98	109.82	101.06	108.81
1979	101.82	102.01	98.40	111.63	102.51	107.66	107.73	102.08	98.79	101.02
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	95.09	97.50	92.43	109.07	122.79	118.22	119.34	120.73	126.22	111.45
1982	87.96	92.81	96.57	115.83	136.50	117.41	118.13	137.43	138.91	106.57
1983	87.59	71.25	70.80	103.65	121.92	94.94	97.04	118.19	119.88	84.67
1984	44.98	49.83	47.37	79.30	93.03	70.42	72.60	88.89	97.29	63.07
1985	40.37	47.15	42.47	72.44	85.84	65.38	67.44	81.97	90.01	59.19
1986	36.85	43.79	77.39	58.43	60.40	44.02	45.41	56.29	64.14	39.56
1987	36.52	41.42	23.30	51.84	51.95	36.11	37.21	46.63	55.77	32.50
1988	35.61	37.48	70.13	46.50	50.20	34.40	35.40	44.77	54.12	31.09
1989	34.56	34.99	21.03	49.02	52.18	35.74	36.86	46.92	55.37	33.74

Source: International Financial Statistics, 1990;
: (16) & (15) from Key Indicators of Developing Member Countries of ADB
: 1967-73 figures for (19) from various FEER Annual Reports

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19 - Taiwan

Rji = ((Eli/Eli80)*100): exchange rate index (foreign currency per peso)
(filename: RIIAS0.WK1

Table 3, continued.

Exchange Rate Index: Foreign Currency per Peso, 1967-1989
(base year: 1980 = 100)

YEAR	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1967	233.64	196.08	85.28	45.67	194.04	373.09	225.42	232.95	212.59
1968	233.55	195.77	87.05	87.09	194.35	269.10	274.90	232.58	212.25
1969	233.51	195.93	96.52	99.37	194.56	268.67	224.68	232.46	212.14
1970	155.90	130.09	65.00	73.57	179.96	179.08	103.77	154.72	141.20
1971	141.05	117.14	66.74	72.99	119.37	162.03	165.50	141.81	129.69
1972	126.71	107.55	72.79	74.40	115.02	144.99	147.07	126.88	124.97
1973	121.69	89.25	72.90	73.58	112.13	124.75	127.60	114.97	117.29
1974	116.15	87.70	73.68	73.24	110.12	122.36	125.94	112.01	116.74
1975	101.74	90.13	82.57	68.59	103.15	113.96	114.78	107.80	109.33
1976	103.97	93.39	80.44	66.82	100.58	117.07	116.50	99.41	106.51
1977	107.51	104.26	80.65	67.16	101.09	114.72	115.60	94.99	107.05
1978	108.94	101.51	81.25	71.89	101.28	108.49	100.30	96.04	104.89
1979	103.20	103.78	81.12	101.17	101.53	102.35	103.41	102.28	101.90
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	113.83	94.27	106.60	95.80	101.33	100.64	93.82	106.29	97.28
1982	130.65	98.51	105.86	92.78	98.80	94.36	87.91	128.40	95.53
1983	122.53	85.35	86.32	93.02	75.93	72.08	66.71	106.14	75.19
1984	87.97	58.27	59.68	73.60	51.93	48.43	44.81	70.36	49.45
1985	82.12	65.64	57.82	71.50	53.54	46.04	41.48	63.73	44.66
1986	62.06	62.58	53.47	75.37	47.33	43.69	37.47	57.71	38.71
1987	54.75	59.37	49.45	95.75	45.88	42.27	35.92	57.20	32.28
1988	51.58	51.74	42.89	95.73	43.99	42.04	33.47	55.84	28.20
1989	52.67	49.69	38.20	97.55	43.38	43.00	31.45	n.a.	n.a.

Source: International Financial Statistics, 1990;
: (18) & (19) from Key Indicators of Developing Member Countries of ADB
: 1967-73 figures for (19) from various FEER Annual Reports

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18 - Hongkong
19 - Taiwan

$RIi = ((EIi/EIi80)*100)$: exchange rate index (foreign currency per peso)
filename: RIXA89.WK1

Table 3a.

Exchange Rate Index: foreign currency per peso, 1988-1989 monthly

MONTH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
988									
Jan	102.45	110.10	105.70	103.83	95.25	96.39	95.99	96.24	96.03
Feb	102.17	108.31	105.74	106.31	97.74	98.80	98.33	98.57	98.63
Mar	101.56	106.07	104.56	101.40	96.44	97.03	96.64	96.89	97.34
Apr	101.55	104.87	102.62	98.94	96.19	96.00	96.24	96.64	97.39
May	101.92	105.40	102.86	99.56	97.45	98.32	97.64	98.06	99.05
Jun	101.74	103.77	104.84	104.56	100.67	101.96	101.56	101.71	102.59
Jul	101.57	102.53	109.33	108.36	105.27	106.70	106.68	106.62	107.22
Aug	101.41	103.31	109.61	109.18	108.06	109.03	109.13	109.03	109.45
Sep	100.50	103.07	109.29	109.11	106.43	106.88	106.87	106.92	108.05
Oct	99.97	100.73	104.33	105.27	103.65	103.73	103.56	103.66	104.77
Nov	99.90	101.67	99.55	100.99	99.46	99.57	99.50	99.46	100.22
Dec	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
989									
Jan	100.07	99.63	102.98	102.97	104.30	104.34	104.40	104.29	103.85
Feb	100.00	97.41	103.34	104.20	105.17	105.50	105.56	105.52	104.74
Mar	100.08	100.02	105.53	106.64	105.55	106.34	106.36	106.30	105.94
Apr	99.73	99.11	106.55	107.20	105.18	106.26	106.25	106.15	105.67
May	98.96	98.69	110.75	110.83	109.19	109.95	109.80	110.12	108.37
Jun	98.51	98.79	114.57	115.93	110.46	111.16	110.96	111.03	109.24
Jul	97.57	96.99	111.06	109.93	104.52	105.33	105.20	105.15	105.28
Aug	97.61	95.92	111.41	111.63	105.83	107.09	107.01	106.86	104.26
Sep	97.21	96.13	114.05	113.12	106.87	108.13	108.05	108.00	105.47
Oct	97.25	95.53	111.35	111.93	102.71	103.41	103.45	103.62	102.81
Nov	96.64	94.50	112.19	112.29	100.24	100.77	100.71	100.72	100.24
Dec	95.62	92.83	111.11	109.53	94.80	94.55	94.93	95.17	95.50

Source: International Financial Statistics, various monthly issues; and
Central Bank Annual Report 1989, vol.I for (18) and (19)

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18 - Hongkong
19 - Taiwan

Rii = (iEli/Eli89dec)1100): exchange rate index (foreign currency per peso)
filename: RIEM.WK1

Table 3a, continued.

Exchange Rate Index: foreign currency per peso, 1988-1989 monthly

MONTH	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1988										
Jan	93.23	100.65	123.53	117.76	98.40	102.73	96.54	106.75	102.15	102.95
Feb	96.22	101.76	122.90	115.35	98.33	102.82	97.80	106.04	101.47	103.00
Mar	95.27	99.45	119.12	111.71	97.70	101.82	96.01	105.20	101.52	103.29
Apr	95.07	98.42	116.65	109.96	98.00	101.53	96.99	104.69	101.67	103.32
May	97.26	99.94	112.42	109.45	98.65	101.91	97.72	105.38	102.22	103.77
Jun	100.67	102.15	103.22	108.55	97.12	102.40	97.01	106.31	101.30	103.81
Jul	105.27	105.76	109.16	107.62	97.48	102.99	98.99	106.93	101.49	103.15
Aug	108.69	103.10	103.07	107.00	99.63	102.99	99.73	106.49	101.21	103.45
Sep	107.15	105.55	106.38	105.68	99.12	102.03	99.34	105.47	100.07	102.77
Oct	104.29	103.31	135.15	103.52	99.03	100.78	99.41	103.97	99.01	101.44
Nov	99.20	100.14	101.01	101.06	98.95	99.79	99.20	100.77	97.07	99.62
Dec	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1989										
Jan	105.53	103.67	93.79	99.68	100.64	100.67	101.00	97.86	99.65	97.60
Feb	106.56	103.98	100.28	98.62	100.92	100.84	101.33	99.15	97.85	98.15
Mar	108.72	105.06	105.38	98.32	101.55	101.26	102.27	99.92	99.79	96.82
Apr	111.12	104.46	106.50	97.16	101.46	101.20	100.96	100.01	95.63	91.59
May	115.96	107.34	110.07	96.29	101.22	101.32	99.04	99.63	98.43	91.01
Jun	113.99	108.44	111.99	95.87	101.10	101.52	97.95	99.21	97.68	89.55
Jul	107.67	103.97	116.71	95.04	100.27	100.98	97.08	98.34	97.51	88.59
Aug	109.75	105.07	110.02	95.23	100.68	100.33	97.12	98.36	97.59	88.21
Sep	111.02	105.68	108.15	95.08	100.67	100.44	97.36	98.79	97.22	87.81
Oct	107.31	103.31	107.81	95.30	100.73	99.95	97.28	98.18	96.61	88.29
Nov	105.79	102.20	106.07	94.85	100.46	99.35	96.94	97.37	96.03	88.65
Dec	101.51	97.06	104.51	94.24	97.47	97.88	95.94	94.34	95.08	88.41

Source: International Financial Statistics, various monthly issues; and
Central Bank Annual Report 1989, vol.I for (18) and (19)

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3 - Japan	7 - Netherlands	11 - Sweden	15 - Thailand	19 - Taiwan
4 - UK	8 - Belgium	12 - Australia	16 - Malaysia	

$SEI = ((EEI_i/EEI_{88Dec})*100)$: exchange rate index (foreign currency per peso)
filename: RIEM.WK1

Table 4. :

Real Exchange Rate Index: Foreign Currency per Peso
(Base year: 1980)

YEAR	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)
1967	100.85	91.71	183.96	146.35	139.91	157.16	173.20	156.25	118.30
1968	93.94	89.88	177.45	163.30	137.53	158.52	171.49	156.54	118.98
1969	94.75	87.03	169.49	157.74	139.04	154.68	161.51	152.79	118.40
1970	68.47	62.37	120.43	113.02	105.62	106.23	119.01	111.46	86.17
1971	73.67	65.76	123.10	113.18	112.25	108.09	119.92	117.23	90.79
1972	74.24	64.12	106.69	107.76	100.78	97.84	106.45	104.95	84.24
1973	80.60	69.47	99.71	116.12	95.46	88.21	99.01	100.10	87.74
1974	96.77	81.51	114.62	139.80	120.94	106.44	115.72	118.26	109.31
1975	88.65	76.50	104.34	118.66	96.26	95.54	98.67	99.08	93.76
1976	89.05	73.39	101.20	133.01	104.08	99.65	100.53	101.23	108.95
1977	92.50	80.95	93.73	131.27	92.25	97.86	97.03	97.11	109.13
1978	92.91	86.28	76.17	119.29	98.41	89.21	88.82	88.21	101.17
1979	97.65	94.90	89.53	111.36	98.11	91.53	92.50	92.10	100.99
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	97.57	98.15	99.66	110.36	122.04	125.91	126.55	127.05	118.15
1982	93.60	92.82	111.58	119.89	134.39	130.82	130.27	146.39	122.90
1983	76.63	74.03	88.33	111.85	120.19	112.57	114.46	128.58	101.69
1984	73.51	74.61	86.77	121.00	128.29	122.61	124.68	136.72	106.28
1985	78.48	83.64	93.99	129.99	137.91	137.23	139.50	148.13	116.93
1986	70.36	75.15	60.73	102.21	95.42	93.23	94.58	101.22	79.32
1987	70.26	70.71	53.56	90.26	87.44	79.21	81.00	85.65	67.75
1988	71.62	66.85	49.93	83.96	84.90	80.97	83.18	88.37	70.38
1989	73.36	65.80	56.45	90.86	93.65	90.57	94.78	99.41	74.97

Source: International Financial Statistics, 1990;
Key Indicators of Developing Member Countries of ADB, 1989 for (18) & (19), and various FEER annual reports for 1967-1973 figures for (19)

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Table 4, continued.

Real Exchange Rate Index: Foreign Currency per Peso
(Base year: 1980)

YEAR	(10)	(11)	(12)	(13)	(14)	(15)	(16)	(17)	(18)	(19)
1967	136.19	134.91	121.73	118.27	142.42	109.25	123.65	110.68	128.07	n.a.
1968	165.43	135.24	124.43	112.26	113.84	110.19	105.67	113.36	127.84	n.a.
1969	182.68	132.47	120.73	104.32	121.01	108.94	107.29	113.82	124.89	n.a.
1970	134.89	95.61	88.49	74.51	91.77	83.73	81.64	87.14	89.21	n.a.
1971	135.25	58.23	53.47	82.32	106.10	93.23	87.50	94.10	96.38	n.a.
1972	122.91	89.80	86.22	86.88	109.76	92.74	82.20	89.01	87.94	n.a.
1973	107.88	94.70	75.39	98.07	96.75	91.25	74.59	74.94	78.65	n.a.
1974	122.37	109.15	87.78	106.70	91.59	96.40	83.31	80.84	90.08	n.a.
1975	99.99	93.48	82.24	102.16	76.97	91.57	79.37	76.59	85.36	n.a.
1976	101.22	94.63	93.30	94.15	68.27	93.63	87.23	86.49	86.76	95.97
1977	106.30	96.55	90.01	94.37	67.80	96.22	89.18	91.53	86.35	99.21
1978	84.59	95.59	97.55	89.11	72.28	96.08	86.45	87.98	88.77	98.83
1979	88.89	99.11	96.34	88.25	100.91	102.79	92.30	94.73	99.24	102.53
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	118.56	114.89	96.62	99.37	96.62	101.88	103.89	98.03	106.22	94.76
1982	118.10	133.62	100.31	101.45	94.09	103.85	101.32	97.43	127.13	99.37
1983	100.23	125.63	87.09	87.93	97.81	84.60	82.10	80.30	105.17	84.96
1984	109.02	126.53	85.60	89.36	99.91	86.30	79.78	79.08	96.62	84.02
1985	121.84	135.47	111.62	104.04	114.15	106.95	93.14	89.70	103.41	93.60
1986	81.42	99.04	98.42	94.34	114.64	93.60	89.47	82.83	92.19	81.17
1987	68.47	86.99	89.50	87.90	138.31	91.82	88.03	81.99	90.05	69.91
1988	69.91	84.21	78.77	77.30	139.13	92.16	95.10	81.79	88.98	65.72
1989	81.34	89.38	78.16	72.12	147.51	95.44	102.74	83.13	n.a.	n.a.

Source: International Financial Statistics, 1990;
Key Indicators of Developing Member Countries of ADB, 1989 for (18) & (19), and various FEER annual reports for 1967-1973 figures for (19)

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Table 4a.

Real Exchange Rate Index: Foreign Currency per Peso, 1988-89 monthly
(base: December 1988)

MONTH	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1988								
Jan	99.36	106.47	99.78	103.25	91.33	91.04	90.70	91.41
Feb	99.46	105.25	101.79	105.21	94.36	93.08	93.56	94.17
Mar	99.28	103.21	99.92	101.56	93.42	92.76	92.16	93.09
Apr	98.92	101.87	97.73	97.60	92.87	92.39	91.62	92.60
May	99.42	102.25	98.41	98.33	94.33	94.15	93.40	94.29
Jun	100.03	101.50	101.45	104.05	98.09	98.47	98.49	98.70
Jul	99.92	100.29	106.56	108.91	102.83	103.79	103.88	103.79
Aug	99.74	101.62	107.09	108.45	105.74	106.42	106.41	106.40
Sep	98.14	100.90	105.65	107.32	103.85	104.23	103.80	104.06
Oct	97.53	98.28	100.81	103.22	101.13	101.42	100.86	101.15
Nov	98.98	100.57	98.16	100.22	98.55	98.67	98.31	98.74
Dec	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1989								
Jan	101.14	100.67	104.75	103.92	105.51	104.79	107.05	105.48
Feb	101.04	100.21	105.87	104.79	106.45	106.09	108.37	106.66
Mar	100.33	100.14	107.40	106.62	106.37	106.56	108.57	107.07
Apr	99.95	99.47	107.18	105.92	105.95	106.47	108.56	106.83
May	99.56	99.01	111.86	110.22	110.68	111.05	113.29	111.82
Jun	100.87	100.46	113.11	116.80	114.00	114.26	116.86	114.75
Jul	100.85	99.24	116.09	112.00	108.64	109.73	111.79	109.57
Aug	102.39	99.70	118.50	115.43	111.94	113.58	115.26	112.89
Sep	102.42	100.61	121.22	117.02	113.63	115.36	116.72	114.35
Oct	102.97	100.49	116.86	116.02	109.73	111.03	112.67	110.63
Nov	103.15	100.15	121.58	116.61	108.05	107.15	110.97	108.79
Dec	104.21	100.70	123.44	116.06	104.42	104.78	106.88	104.76

Source: International Financial Statistics, various monthly issues; and
Central Bank Annual Report 1989, vol.1 for (18) & (19)

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Table 4a, continued.

Real Exchange Rate Index: Foreign Currency per Peso, 1988-89 monthly
(Base: December 1983)

MONTH	(9)	(10)	(11)	(13)	(14)	(15)	(16)	(17)
1988								
Jan	93.79	88.24	93.[illegible]	116.93	96.48	99.01	92.30	100.93
Feb	96.71	91.49	100.10	113.57	95.69	99.00	94.09	106.35
Mar	95.62	90.75	92.[illegible]	109.31	96.63	95.27	93.66	100.53
Apr	95.55	90.09	96.[illegible]	107.76	96.37	97.30	92.77	100.18
May	97.35	93.36	97.05	107.38	95.59	98.50	94.84	100.92
Jun	101.57	97.59	100.74	106.31	97.83	97.87	96.01	102.98
Jul	106.54	102.97	104.68	105.35	97.49	100.59	97.20	103.61
Aug	103.76	106.37	107.38	105.74	97.73	100.95	98.27	103.74
Sep	106.73	104.67	104.54	104.07	97.18	99.01	97.51	102.55
Oct	103.06	102.05	100.93	102.39	96.96	97.61	97.93	101.56
Nov	99.53	98.39	99.29	100.82	98.02	98.52	98.86	99.96
Dec	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1989								
Jan	104.73	106.53	103.49	101.03	101.62	101.66	102.55	101.40
Feb	105.20	107.61	104.22	100.23	100.83	100.97	103.21	100.78
Mar	105.61	109.30	104.79	98.88	101.29	101.22	103.61	101.39
Apr	105.44	111.73	103.75	97.86	100.18	101.47	102.81	101.37
May	108.67	117.64	107.23	96.73	100.33	101.87	101.53	101.21
Jun	111.25	117.81	110.10	98.03	102.41	103.53	103.54	102.55
Jul	106.27	112.72	106.83	98.44	102.32	101.95	102.32	102.68
Aug	108.80	116.48	109.31	99.53	104.37	102.82	104.36	104.21
Sep	110.39	113.20	109.90	99.24	104.94	103.30	105.23	105.48
Oct	107.74	114.59	107.57	100.15	105.20	103.21	106.02	105.50
Nov	105.59	113.11	107.30	100.57	105.51	103.78	106.19	105.25
Dec	102.48	110.39	106.03	102.29	106.91	105.20	107.10	104.19

Source: International Financial Statistics, various monthly issues; and Central Bank Annual Report 1989, vol.I for (18) & (19)

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5 - France
6 - Germany
7 - Netherlands
8 - Belgium
9 - Italy
10 - Switzerland
11 - Sweden
12 - Australia
13 - Korea
14 - Indonesia
15 - Thailand
16 - Malaysia
17 - Singapore
18 - Hongkong
19 - Taiwan

Table 6.
Trade Weights for Different Sets of Partner Countries, 1980

	wxi	wti
1	0.37171	0.38506
2	0.014975	0.01572
3	0.35921	0.34738
4	0.034135	0.03669
5	0.02214	0.02053
6	0.05950	0.06536
7	0.08532	0.05276
8	0.00802	0.00771
9	0.01556	0.01488
10	0.00238	0.00627
11	0.00413	0.00957
12	0.02286	0.03727
1	0.403	0.434
3	0.389	0.391
6	0.065	0.073
7	0.092	0.059
13	0.051	0.043
1	0.408	0.435
3	0.395	0.391
4	0.038	0.041
6	0.065	0.074
7	0.094	0.059
1	0.451	0.462
3	0.436	0.416
4	0.041	0.044
6	0.072	0.078
1	0.4703	0.483
3	0.4544	0.435
6	0.0753	0.082

Sources of Data: DOTS 1990 and FSY 1989.

Table 7.

Nominal and Effective Exchange Rates

YEAR	NEER				REER			
	NP12T60AY	NP5T60AY	NP4T60AY	NP3T60AY	RP12T60AY	RP5T60AY	RP4T60AY	RP3T60AY
1967	255.35	261.01	255.52	259.90	140.61	142.09	139.97	139.01
1968	256.51	261.19	255.65	258.94	138.53	139.50	137.33	136.62
1969	255.57	259.04	254.21	257.43	132.90	133.50	131.55	130.85
1970	168.86	171.40	167.60	169.87	95.25	95.39	93.80	93.27
1971	151.61	154.03	150.83	152.69	99.14	99.21	97.78	97.35
1972	135.55	137.40	134.59	135.99	91.46	91.56	90.50	90.00
1973	123.96	126.10	124.17	125.65	89.92	90.37	87.77	88.99
1974	126.49	128.87	127.56	128.38	106.76	107.23	106.67	105.66
1975	118.31	120.73	120.03	120.57	96.37	97.22	97.14	96.41
1976	117.43	119.14	118.20	117.67	96.65	97.18	96.96	95.65
1977	112.60	113.65	112.93	111.91	94.95	95.12	95.00	93.56
1978	101.64	101.32	100.71	99.67	86.94	86.38	86.22	84.28
1979	101.15	101.00	100.89	100.40	94.40	94.14	94.25	93.51
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	99.00	97.79	96.42	95.85	103.45	102.67	101.16	100.75
1982	98.68	96.49	95.13	94.14	107.50	106.36	104.85	104.12
1983	77.01	74.09	72.65	71.23	89.10	87.41	85.72	84.41
1984	53.26	50.77	49.41	48.09	89.29	87.12	84.77	82.92
1985	48.90	45.95	44.60	43.33	97.67	94.35	91.54	89.52
1986	37.64	35.07	34.42	33.32	74.43	71.68	70.27	68.55
1987	34.25	31.99	31.66	30.73	69.64	66.56	65.70	64.34
1988	31.94	29.70	29.55	28.77	67.70	65.99	64.97	63.90
1989	32.09	30.03	29.66	28.77	72.34	70.82	69.44	68.19

filename: T2.WK1

Table 7a.

Nominal and Effective Exchange Rates

YEAR		NEER			REER		
	MONTH	RC5T60AM	RC4T60AM	RC3T60AM	RC5T60AM	RC4T60AM	RC3T60AM
1986	Jan	105.47	100.61	98.24	102.35	96.76	95.12
	Feb	104.67	100.76	98.72	101.79	97.19	95.94
	Mar	103.26	99.92	97.67	100.49	97.02	95.64
	Apr	102.76	99.91	96.97	99.99	96.63	95.59
	May	103.69	100.57	98.71	100.27	97.49	96.14
	Jun	103.18	101.05	99.03	101.12	98.88	97.28
	Jul	103.41	101.75	99.75	101.40	99.46	97.84
	Aug	103.35	101.91	100.14	101.53	99.58	98.37
	Sep	102.47	101.23	99.60	100.40	98.95	97.56
	Oct	101.49	100.69	99.42	99.66	98.58	97.44
	Nov	100.02	99.61	99.17	99.41	98.65	98.42
	Dec	100.00	100.00	100.00	100.00	100.00	100.00
1987	Jan	100.30	100.54	100.79	101.60	101.83	101.99
	Feb	100.05	100.54	101.08	101.15	101.52	101.60
	Mar	100.44	101.28	101.60	101.10	101.98	102.20
	Apr	99.52	100.87	101.20	100.39	101.39	101.39
	May	99.06	100.15	100.35	99.83	101.06	101.01
	Jun	98.64	100.02	100.33	101.50	102.88	103.01
	Jul	97.73	98.79	98.96	101.26	102.38	102.27
	Aug	97.91	98.97	99.20	102.65	104.17	104.15
	Sep	98.00	97.16	97.30	103.36	105.01	104.83
	Oct	97.91	98.94	99.24	103.84	105.32	105.25
	Nov	97.44	98.47	98.89	104.06	105.46	105.54
	Dec	96.12	96.86	97.63	104.99	106.07	106.78

filename: T32.WK1

Table 8.

Nominal and Effective Exchange Rates

YEAR	NEER				REER			
	NC7T80AY	NC5T80AY	NC4T80AY	NC3T80AY	RC7T80AY	RC5T80AY	RC4T80AY	RC3T80AY
1967	189.91	210.24	204.66	177.35	n.a.	145.43	118.19	123.19
1968	188.41	204.12	201.00	172.50	n.a.	133.08	109.64	108.04
1969	191.62	205.30	206.61	180.36	n.a.	131.08	111.81	110.67
1970	129.82	139.08	140.61	123.97	n.a.	97.24	85.19	84.12
1971	120.45	127.97	129.12	115.09	n.a.	104.87	93.44	93.08
1972	113.23	119.55	119.32	108.33	n.a.	100.89	90.26	90.93
1973	104.06	108.54	107.23	99.37	n.a.	93.06	80.42	83.44
1974	103.00	107.32	105.76	97.98	n.a.	99.06	85.40	87.65
1975	97.86	102.34	97.99	91.51	n.a.	91.50	78.97	80.11
1976	96.70	102.47	99.76	91.92	86.98	93.05	82.39	80.51
1977	95.48	101.87	97.76	90.87	88.47	94.97	84.43	81.33
1978	94.41	98.69	95.52	90.58	87.78	91.65	83.64	81.78
1979	98.31	97.71	102.17	101.70	95.67	95.98	96.58	97.46
1980	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
1981	100.91	99.41	97.20	98.49	100.20	99.10	99.63	100.22
1982	102.81	95.46	92.47	94.22	105.10	98.22	98.01	98.21
1983	85.68	75.67	79.62	84.60	91.23	81.45	87.67	90.19
1984	58.75	51.86	56.17	60.55	89.69	80.16	87.96	90.87
1985	55.22	50.07	54.01	58.84	101.55	93.18	101.86	105.76
1986	51.89	46.26	52.90	58.85	93.93	84.70	98.30	103.02
1987	52.78	45.48	58.72	67.51	95.49	83.11	108.49	116.20
1988	50.38	42.83	58.01	67.48	94.04	80.74	111.36	119.63
1989	n.a.	41.08	58.05	68.31	n.a.	81.69	117.92	127.40

filename: T20.WK1

Table 8a.

Nominal and Effective Exchange Rates

YEAR	MONTH	NEER			REER		
		NP5T80AM	NP4T80AM	NP3T80AM	NP5T80AM	NP4T80AM	NP3T80AM
1968	Jan	102.95	103.39	103.37	98.54	99.04	98.85
	Feb	103.65	103.99	103.98	99.96	100.38	100.12
	Mar	102.10	102.45	102.50	98.71	99.13	99.02
	Apr	101.20	101.51	101.62	97.49	97.87	97.88
	May	101.67	101.92	102.03	98.22	98.53	98.54
	Jun	103.16	103.26	103.20	100.54	100.68	100.52
	Jul	105.59	105.52	105.37	103.45	103.43	103.18
	Aug	105.96	105.76	105.60	103.87	103.71	103.50
	Sep	105.14	105.04	104.85	102.35	102.26	102.01
	Oct	102.38	102.31	102.18	99.53	99.45	99.29
	Nov	99.76	99.78	99.72	98.65	98.67	98.60
	Dec	100.00	100.00	100.00	100.00	100.00	100.00
1969	Jan	101.90	101.74	101.68	103.28	103.05	103.01
	Feb	102.21	102.00	101.90	103.88	103.60	103.54
	Mar	103.31	103.12	102.96	104.28	104.02	103.90
	Apr	103.57	103.40	103.23	104.00	103.72	103.62
	May	105.51	105.25	104.99	106.44	106.02	105.84
	Jun	107.17	106.94	106.53	110.17	109.76	109.44
	Jul	104.37	104.33	104.07	108.53	108.34	108.12
	Aug	104.83	104.70	104.39	110.76	110.49	110.26
	Sep	105.89	105.77	105.43	112.13	111.86	111.62
	Oct	104.31	104.37	104.02	110.87	110.77	110.52
	Nov	103.70	104.12	103.74	111.90	111.98	111.76
	Dec	102.15	102.61	102.29	112.35	112.70	112.54

filename: T10.WK1

Table 9.

Parallel Market and Official Rates, 1967 - 1989.

	official rate (P/$)	parallel market rate (P/$)	parallel market rate ($/P)	real parallel market rate ($/P)	real parallel market rate index
1967	3.9237				
1968	3.9300				
1969	3.9321				
1970	5.9077				
1971	6.4317				
1972	6.6748	7.03	0.14225	0.0936	74.52
1973	6.7563	7.20	0.13889	0.1006	80.10
1974	6.7879	7.14	0.14006	0.1229	97.85
1975	7.2479	7.90	0.12658	0.1082	86.15
1976	7.4403	7.91	0.12642	0.1119	89.09
1977	7.4028	7.80	0.12820	0.1165	92.75
1978	7.3658	7.86	0.12723	0.1157	92.12
1979	7.3776	7.97	0.12547	0.1206	96.02
1980	7.5114	7.96	0.12563	0.1256	100.00
1981	7.8997	8.18	0.12225	0.1260	100.32
1982	8.5400	8.71	0.11481	0.1221	97.21
1983	11.1127	12.42	0.08052	0.0915	72.85
1984	16.6987				
1985	18.6073				
1986	20.3857				
1987	21.5677				
1988	21.0947				
1989	21.7367				

Source: Pick's Currency Yearbook, 1977-79 for 1972-79 parallel various weekly issues of Far Eastern Economic Review parallel market rates, and IFS Yearbook 1990 for the

PART C. Lotus Template for Monitoring Exchange Rate Movements

This section documents the Lotus template constructed for the monitoring mechanism.

The selected measures or indicators of overvaluation were suggested in Natividad (Annex). These are the nominal (NEER) and the real (REER) effective exchange rates of the Philippines for different country groupings claasified according to whether these groups are competitors or partners. The general fornmula for the NEER is:

$$NEER_g = (\Sigma_{i=1}^{n} w_i r_i)_g$$

where i = country index, g = group index

w = trade weights, r = nominal exchange rate index

The REER is:

$$REER_g = NEER_g / [(\Sigma_{i=1}^{n} w_i p_i)/p]_g$$

where p_i= CPI of country i, p = Philippine CPI

Data used are on a monthly basis. The sources of the data are detailed in the Annex. Some data presented on a yearly basis in this Annex are not available monthly (CPI of Australia, Hongkong and Taiwan). Because of these constraints, some of the suggested measures cannot be used for monitoring purposes.

Features of the Program

The Lotus template constructed is a menu-driven program which allows the user to maintain a data base for the computation of measures of currency overvaluation. The main purpose of the template is to assist and facilitate the monitoring of the Philippine currency's degree of over- or undervaluation. In this regard, selected measures chosen from a review and revalidation of existing measures were embedded in the Lotus worksheet.

The program is open ended and allows the user to get in and out of the program easily. The menus built in to the program is an attempt to make the software user friendly and easy to handle.

The Template is contained in the file "EER.Wk1". After this file is retrieve from the 123 program, a message appears on the worksheet as follows:

> This Lotus Template is an open ended program that allows the user to choose the desired operation through the Menu given above the screen. After each operation, the user can press
>
> Alt-P
>
> to go back to this program. This program computes for different measures of exchange rate over- or under-valuation and contains graphing and printing routines.
>
> The Data and Computation areas start at column I. All program subroutines are located at columns A to H

The main menu mentioned in the message appears as:

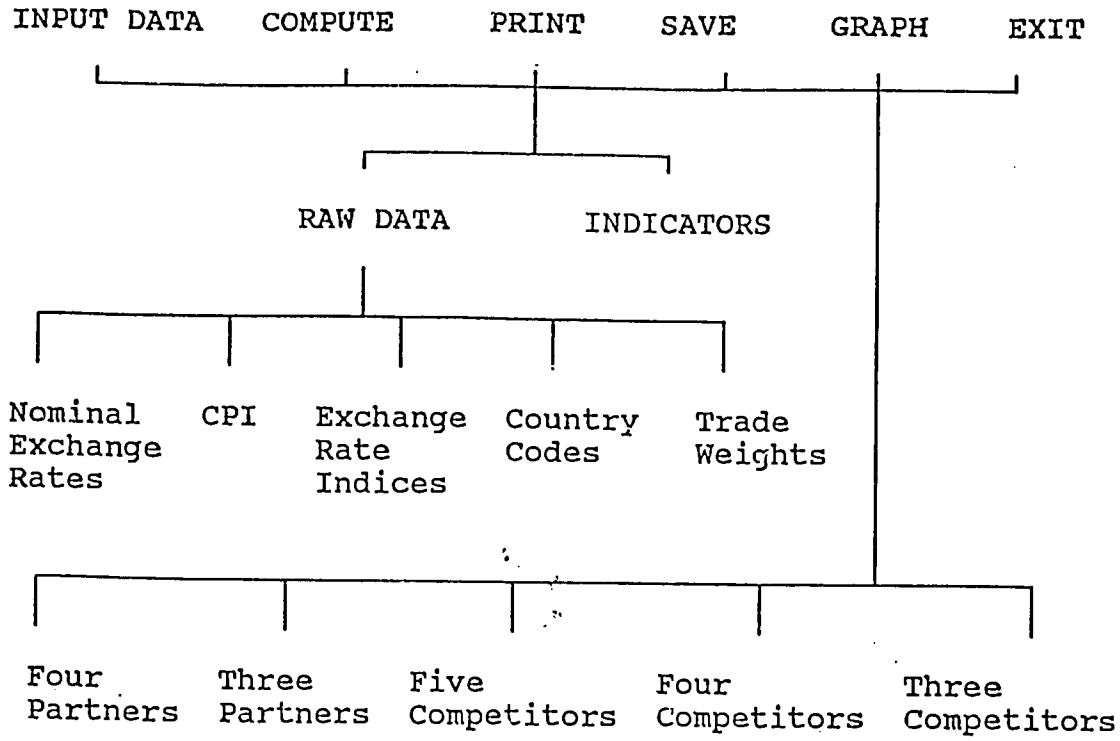
INPUT DATA COMPUTE PRINT SAVE GRAPH EXIT

Each menu entry indicates a specific operation which is stated just below it:

INPUT	- Update/edit data bank
COMPUTE	- Compute measures of overvaluation and display results
PRINT	- Direct output of computations to the printer (sub-menu)
SAVE	- Save session
GRAPH	- Plot/Graph indices (sub-menu)
EXIT	- Move out of this Program

The printing and the Graphing operations contains sub-menus which permits the user to choose among options. The printing sub-menu allows the user to print the raw data or the computed indicators. The graphing sub-menu gives the user the choice of what index he would like to view graphically. The structure of the program is given below.

MENU STRUCTURE



RESTRICTIONS: The restrictions required for the program to work properly are:

1] avoid changing the individual and global column width of the worksheet.

2] <u>more importantly, do not use the COMPUTE routine if the raw data isnot fully updated</u>.

UPDATING OF RAW DATA: Only the nominal exchange rates (in foreign currency per peso) and the CPI for all countries need to be updated.

- choose INPUT DATA from main menu

COMPUTING INDICATORS: Make sure that the data is fully updated for at least two (2) months.

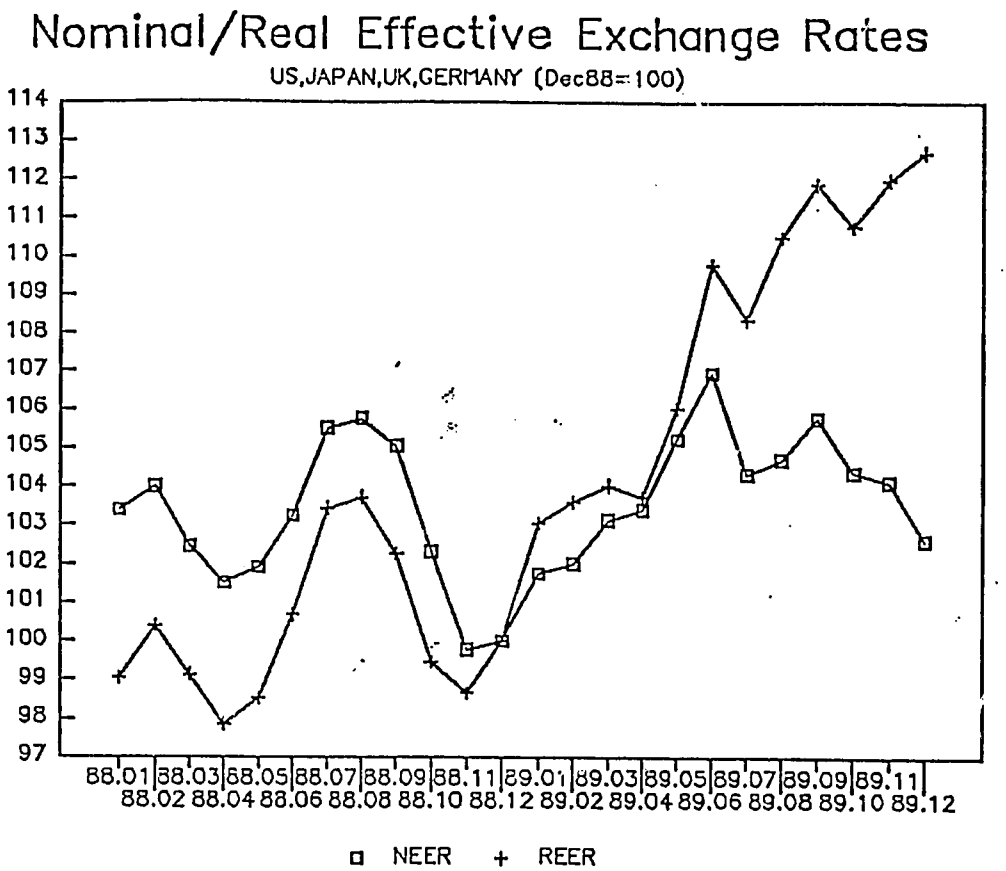
- choose COMPUTE from the main menu

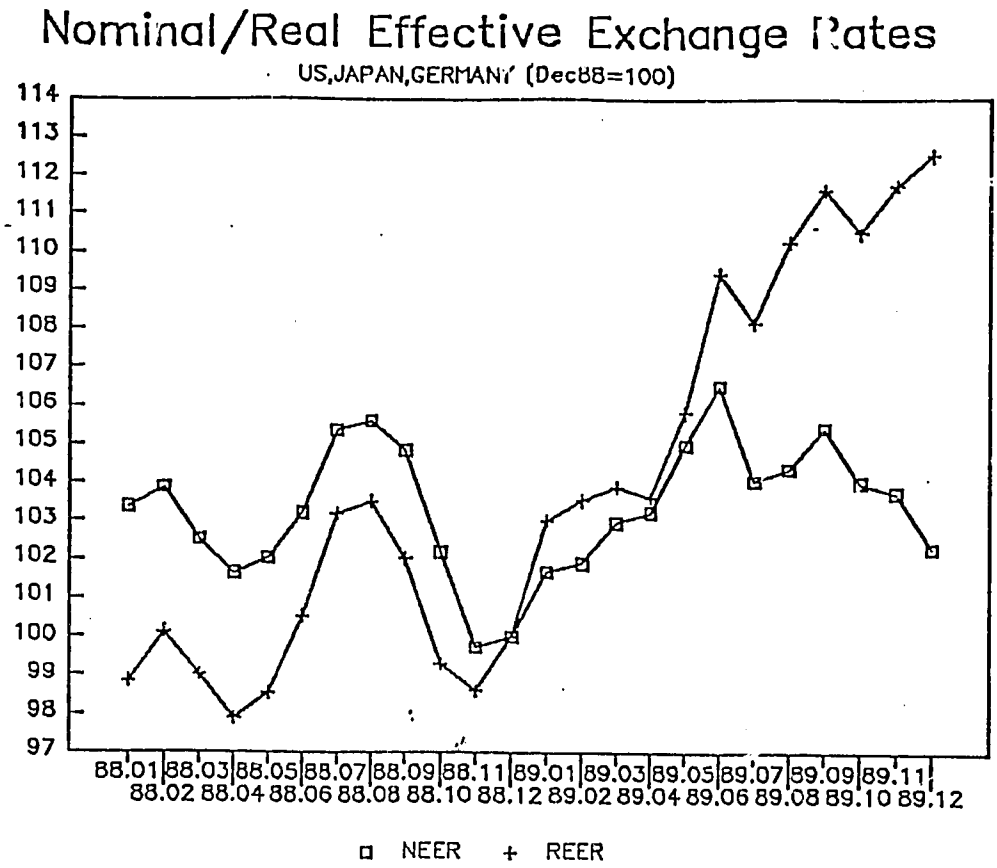
NOTE: Sensitivity analysis can be done using this template. To do this however, assumptions regarding the growth of nominal exchange rates and the CPI for all countries have to be made.

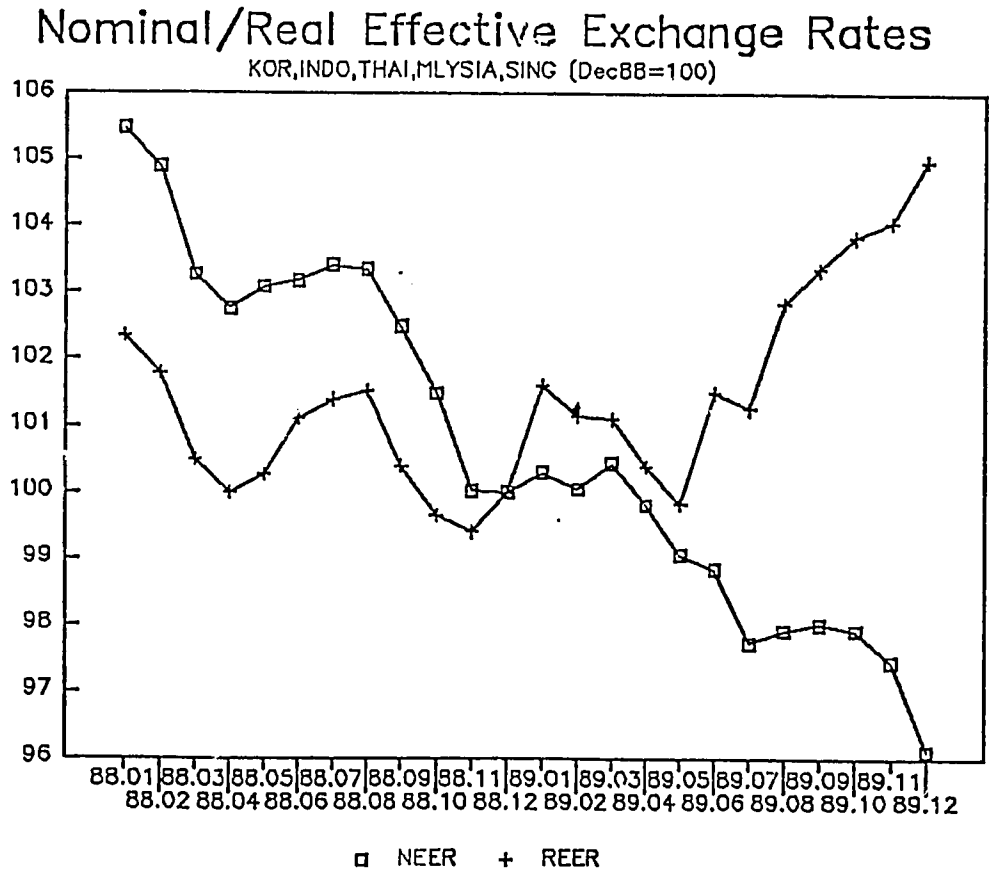
Given below is a sample output of the program.

Sample Output

The following graphs and printed data were generated using the template for the period January 1988 to December 1989:




Nominal/Real Effective Exchange Rates
US,JAPAN,GERMANY (Dec88=100)
114
113
112
111
110
109
108
107
106
105
104
103
102
101
100
99
98
97
88.01 88.02 88.03 88.04 88.05 88.06 88.07 88.08 88.09 88.10 88.11 88.12 89.01 89.02 89.03 89.04 89.05 89.06 89.07 89.08 89.09 89.10 89.11 89.12
NEER
REER


Nominal/Real Effective Exchange Rates
KOR,INDO,THAI,MLYSIA,SING (Dec88=100)
106
105
104
103
102
101
100
99
98
97
96
88.01 88.02 88.03 88.04 88.05 88.06 88.07 88.08 88.09 88.10 88.11 88.12 89.01 89.02 89.03 89.04 89.05 89.06 89.07 89.08 89.09 89.10 89.11 89.12
NEER
REER

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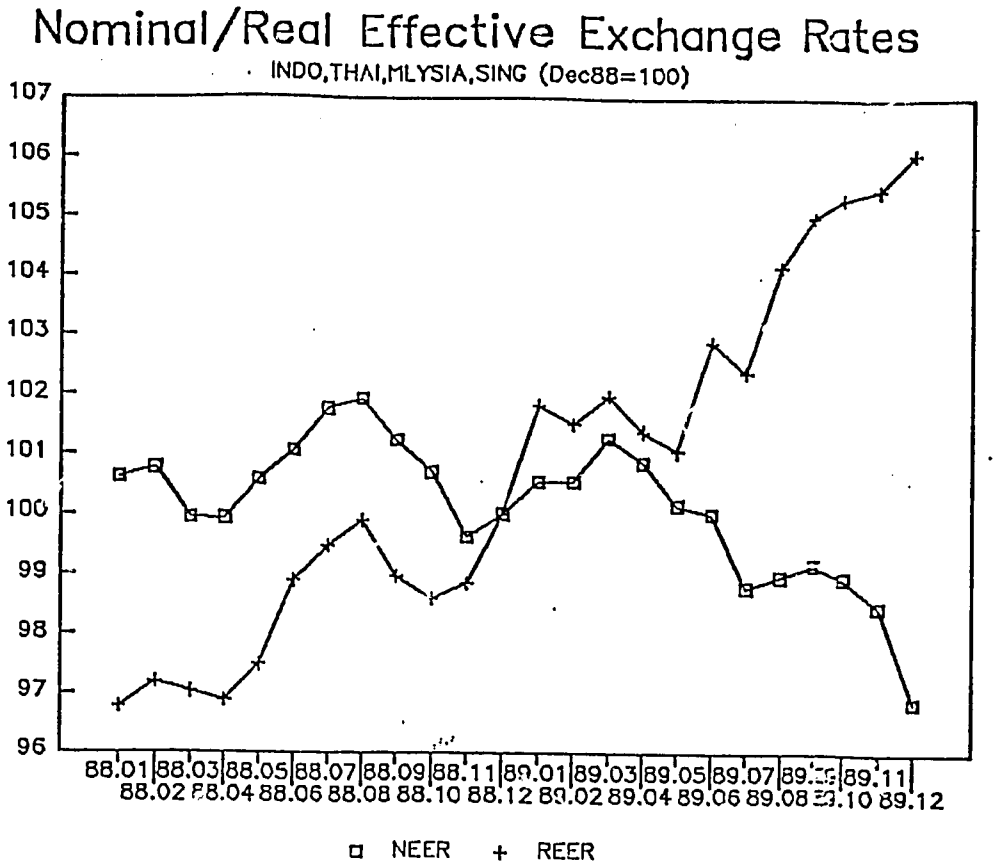
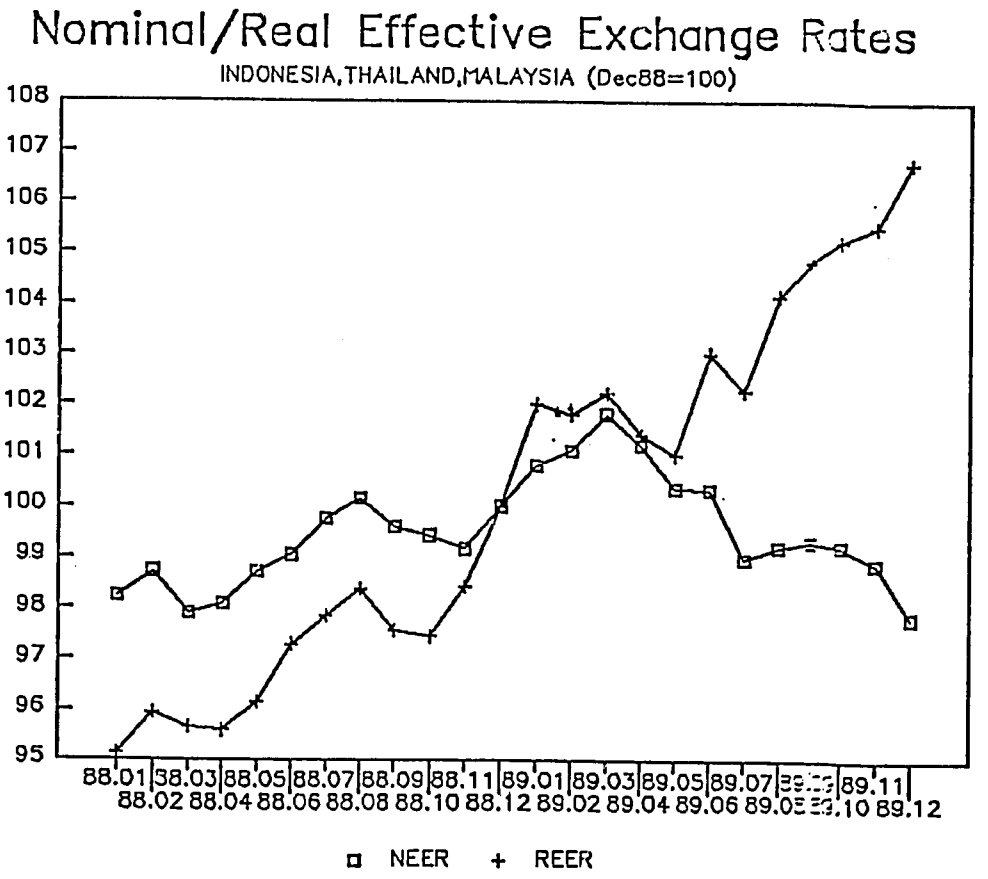

Nominal/Real Effective Exchange Rates
INDO,THAI,MLYSIA,SING (Dec88=100)
107
106
105
104
103
102
101
100
99
98
97
96
88.01 88.02 88.03 88.04 88.05 88.06 88.07 88.08 88.09 88.10 88.11 88.12 89.01 89.02 89.03 89.04 89.05 89.06 89.07 89.08 89.09 89.10 89.11 89.12
NEER
REER


Nominal/Real Effective Exchange Rates
INDONESIA,THAILAND,MALAYSIA (Dec88=100)
108
107
106
105
104
103
102
101
100
99
98
97
96
95
88.01 88.02 88.03 88.04 88.05 88.06 88.07 88.08 88.09 88.10 88.11 88.12 89.01 89.02 89.03 89.04 89.05 89.06 89.07 89.08 89.09 89.10 89.11 89.12
NEER
REER

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